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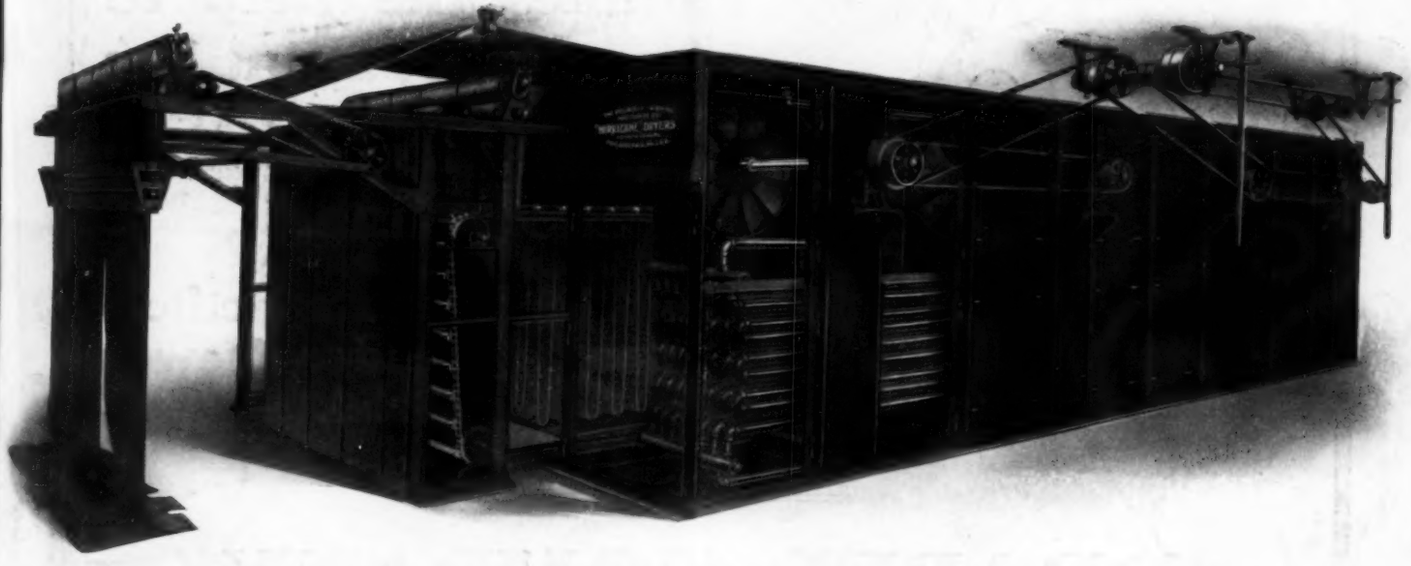

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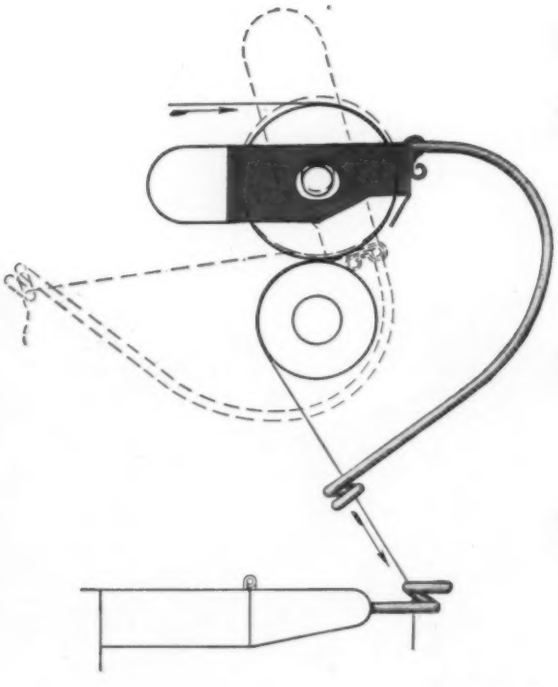

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COTTON

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REVISING THE COTTON SCHEDULE.

Two-thirds of the summer is over and the fruitless tariff agitation and prolonged argument in Congress goes merrily on, while cotton manufacturers and their thousands of idle employees continue to "pay the piper." Business repression unparalleled in the history of cotton manufacturing exists to-day. The margins of profit during the past two years have been so close to a loss that notices of reduction or passing of dividends and ofttimes of complete failure have become so common as to cease to attract attention outside the immediate circle of acquaintances.

Realizing the critical conditions surrounding their industry, the members of the Arkwright Club, the National Association of Cotton Manufacturers, and the American Cotton Manufacturers Association, at their spring meetings appointed a joint tariff committee to take up this question with the servants of the people at Washington. The joint committee prepared a brief, which they submitted to Oscar W. Underwood, chairman of the Committee on Ways and Means, which is summed up in their conclusion as follows:

"We beg the especial consideration of your committee to the deplorable state of the cotton manufacturing industry; to the fact that it already has to bear its share, and perhaps more, of the revenue collected under the tariff; that its schedule already represents the closest kind of an approximation to as much of a competitive basis as the industry can stand; and that sweeping or general changes in it will result disastrously and the consequence be very far reaching. We therefore ask that there be no revision of the cotton schedule."

This brief was submitted under date of June 6th. Under date of June 10th Mr. Underwood acknowledged to R. M. Miller, Jr., chairman of the Tariff Committee of the American Association, the receipt of the brief, giving his assurances that it would receive consideration at the proper time. Under date of June 30th, Mr. Miller wired Mr. Underwood as follows: "Please do not overlook the fact that our committee is hoping for the hearing about which you wrote me on the 10th inst. We can appear at any time you say on three or four days' notice by wire, as some of the members live far South. As we have been holding ourselves in readiness to go, awaiting your advices for two or three weeks, we would now esteem it a great favor if you could indicate by telegram collect about when you would like us to appear."

Mr. Underwood acknowledged this telegram under date of July 1st and advised that another meeting of the Ways and Means Committee would be held some time during the next week or ten days, at which time he would advise the tariff committee as requested. Under date of July 6th, Mr. Underwood wrote Mr. Miller that "The Democratic members of the Ways and Means Committee had their first meeting on the cotton schedule this morning. After looking over the facts before them and the briefs, they concluded not to go into general hearings on the subject." Mr. Underwood stated further that should they desire to

place any further facts before the committee, that he would be glad to receive them personally, or by letter, as they desired, and that the committee would probably be at work on the cotton schedule for the following ten days before reaching any final conclusion in reference to the matter.

On July 10th Mr. Miller in behalf of the Tariff Committee forwarded to Mr. Underwood Tariff Bulletin No. 1 and Tariff Bulletin No. 2, copies of which were also mailed to other members of the Ways and Means Committee. These tariff bulletins set forth the general position of the cotton manufacturers as concerns Schedule I. On July 18th the tariff committee of the American Association had a meeting at Charlotte, N. C., at which time they adopted resolutions indorsing the action of the communications of the chairman of their committee and prepared the following letter to Mr. Underwood:

Mr. O. W. Underwood, Chairman Ways and Means Committee, House of Representatives, Washington, D. C.

Sir:

As instructed by the Tariff Committee of the American Cotton Manufacturers' Association, which met here in Charlotte to-day, I have the honor to reply further to your favor of the 6th inst. stating our position on proposed legislation relating to Schedule I, Cotton Manufactures, as follows:

(1) We are opposed to any revision that will increase the percentage that now exists of importations to total manufactures of cotton.

In figuring percentages of importations to manufactures we call attention to the fact that importations under the cotton manufactures schedule were 17¾ per cent of the total cotton manufactures for the year 1910 in the United States, including laces and other such luxuries that are not as yet made in great quantity in this country, although it is interesting to note that the manufacture of laces in the United States increased in value from three and one-half millions in 1900 to nearly ten millions in 1910.

We believe that any way it may be considered, the present importations are sufficient to protect the consumer by regulating prices, for there is no monopoly or restraint of trade but on the contrary the keenest competition among the cotton manufacturers in the United States.

We do not believe that anything more regulative of prices can be secured, however much importations may be increased, for American manufacturers are already down to cost, and without radical cutting of wages, which is not believed could or should be effected, the chief result of legislating more foreign goods into this country would be only to transfer that work to foreigners, for importers do not usually undersell a local market except enough to bring in their goods.

We believe that the cotton schedule bears its share of the customs revenue for the support of the government, and that there is no call for increasing the amount collected under it.

2. We are opposed to revision without adequate data.

3. We offer our assistance in obtaining such data.

4. We are in favor of such revision as will protect all classifications under the schedule primarily in proportion to their labor costs, and are especially in favor of simplification of the schedule.

5. We are opposed to any revision that does not take into account differences in other conditions as well as labor costs, particularly on account of Southern mill conditions.

6. We are opposed to reductions of duty on machinery and other items entering into the cost of mills, except such as will keep them on a parity with our own industry as to labor and other costs at home and abroad. We do not want our property depreciated, nor do we want broadly to injure other industries to help our own. Let each case rest on its merits and benefit equally.

7. We are opposed to personal hearings; too often it has been alleged that unfair advantage has been taken that way in making the tariffs of the past.

8. We are in favor of publicity and record, and of the freest and most open discussion and consideration of everything relating to tariff-making.

9. We demand that the data upon which revision is based be made public and a matter of record except with such concealment of names that good faith dictates with those furnishing data. If publicity is good for other things, and we believe it is, it certainly is desirable in such a vitally important matter as the tariff.

We also demand a definite statement as to just what it is intended by its makers that the revision shall accomplish:

(a) What measure of protection is it intended to afford to American cotton manufacturers—equality in labor cost only, equality in cost of production, or what?

(b) How much relative increase or decrease is intended on importations, which means how much more or less competition is it intended to impose upon us?

(c) If more competition, how are we expected to meet it?

(d) If we are expected to cut labor, how is that labor to be compensated for the reduction and what can it definitely expect in lesser cost of living to offset the cut?

(e) What amount of revenue is the proposed new tariff on cotton manufactures expected to yield?

(f) What reduction is expected, if any, in the cost of articles of cotton manufacture to the consumer at retail stores?

We ask consideration of the above in the spirit in which it is offered.

We intend no reflection; we merely ask to have our way pointed out by those who make the way.

We ask that it be borne in mind that our industry directly concerns two millions of people, and indirectly many more; that we are not simply manufacturers and employees asking protection for our property and our labor, but that we are citizens most of whom voted for the party proposing this revision and who expected not only that any revisions would be made with as much prudence as would be exercised in private business matters, but also that they would be conducted with all the publicity that was generally promised among other reforms.

We beg to remain

Respectfully yours,

R. M. MILLER, JR., Chairman.

The following list of questions were prepared by the Tariff Committee and addressed to members of the association with the request that they each express their views and propose questions for discussion that will help to throw new light on this subject:

Why should the cotton industry be selected for tariff revision among the first when its products have advanced least of all the great commodities during the past ten years?

How many members of the Ways and Means Committee would risk a decision based upon the actual knowledge they now possess with which to revise the cotton schedule were

it a private business and in which were concerned their all, whether it be property or employment?

Is it any more unreasonable that all the facts upon which to base a revision of the cotton tariff be published than that a court makes public record of the testimony upon which it bases its findings in dealing with property or the employment rights of citizens?

"Those thousands of pages of hearings taken two years ago"? Would that kind of testimony be considered competent in any court? Is that adequate investigation? And was its sufficiency and kind admitted then by the minority, the present majority? Are they prepared to now endorse it, even when it is two years out of date?

Is the cotton industry really suffering? Is it really depressed as never before in its history? No one disputes that, but some legislators tell us that the present depression in cotton manufacturing is due to over-production—too much supply, too little demand. How will letting in more foreign goods help that condition? Will it enable us to manufacture at a profit? Will it give regular employment to our operatives who now suffer on account of shut-downs and curtailment? If not, who will benefit by it? Will it not be the foreign manufacturers and the foreign operatives?

Is the situation going to be saved by the expected bumper cotton crop? It may be for a while, if cotton goes down and goods do not follow it; but would it not be temporary if many workers leave the mills and go back to the farms, more cotton crops becoming bumper crops and the old level of low-priced cotton reached? But again, who will profit. Will the farmer by having the price of his staple crop revised downward? Will the merchant by having the purchasing power of so many of his customers revised downward? Will not those operatives who remain in the mills and accept the revision downward in their wages want to know why it should be deemed legislatively necessary, when, as a class, the manufacturers themselves have operated for the past two years with no profit, and many at a loss, without cutting wages?

It is hoped that every cotton manufacturer will advance his ideas on this vital topic and to any who care to make public their position on this question, the columns of COTTON are open.

Severe criticism is being visited upon Mr. Underwood and the democratic members of the Ways and Means Committee because of their refusal to hear the argument of the cotton manufacturers when they asked leave to appear before them. The Tariff Committee had fully expected the subject to be submitted to a full meeting of the Ways and Means Committee and believed that enough democratic members would vote with the republicans in favor of the proposition to assure the hearing of the argument. Instead of this, Chairman Underwood received them with the courtesy and consideration outlined in the above correspondence, but submitted the matter only to democratic members and these rejected the demand for the hearing entirely.

With a competent Tariff Commission working steadily to secure the best and most definite information necessary for the proper revision of any tariff schedule, it is, to say the least, very unfortunate that Cotton Schedule I and the great manufacturing interests which it protects, should be so ineradicably injured by political demagogism. It is very doubtful if the President will approve of this bill even if it is "juggled" by in the Senate; but in any event it has already laid its cold fingers on the throat of the cotton manufacturer, the after results of which will be seen for months to come.

THE SOUTH AS A FIELD FOR BUSINESS.

All eyes are turned toward the Panama Canal; and the percentage of probable increase in the business to be transacted through the Southern ports of this country after the canal is opened is a prolific source of discussion at the present time. Very few people, however, actually realize the steady growth of business that has been and is going on in the sixteen Southern states.

Perhaps this increase may best be illustrated by actual figures. For the eleven months ending with May, 1911, the imports at the port of New York showed a loss of 51 million dollars in round numbers, as against a corresponding period in 1910; Boston showed a loss of 13½ million dollars during the same period; and Philadelphia a loss of 4¼ million dollars. During the same period, however, Baltimore showed an increase in imports of 2 million dollars; Charleston an increase of 1 million dollars; Savannah an increase of 1½ million dollars; and New Orleans an increase of 10 million dollars.

Exports for the eleven months ending May, 1911, show in round numbers an increase of 6¼ million dollars for Baltimore; 9½ million dollars for Savannah; 8¼ million dollars for Wilmington, N. C.; 48½ million dollars for Galveston; and 31 million dollars for New Orleans, over the same period in 1910. This large percentage of increase in both imports and exports in Southern ports when the larger ports of the North Atlantic district are showing a loss in imports and a gain of only 14½ per cent in exports, indicates plainly the present trend of business. And the South has hardly begun. Millions of tons of minerals lie untouched in the hills; millions of horsepower in electrical energy remain undeveloped in the streams; mile after mile of standing timber shows no marks of the lumberman; and the surface of the fertile valleys and uplands has only been touched here and there by the agriculturalist.

All present indications point to a "bumper" crop of cotton this year. This will bring millions of dollars to this section that will be seeking investment and will at the same time place the textile industry once more in its proper producing position by virtue of abundant raw material. Capitalists who go to wintry Alaska and other far distant points to make investments, should profit by the example of the shrewd foreigner. Only a few months ago an English syndicate purchased 32,000 acres of Mississippi cotton land and during the past month the deeds were signed transferring 9,000 acres more of these rich delta lands to a syndicate representing bankers and capitalists of Holland. It is also reported that Germans have recently purchased 177,000 acres of Florida land for colonization purposes.

Manufacturers and others who are not now participating in the business distributed from these sixteen states should immediately take advantage of the present opportunity. The South is coming into her own and the men of money, brain, or brawn who come to this rich section will all secure their proportionate share of the golden reward now overflowing from this land of natural, agricultural, and industrial prosperity.

THE SOUTHERN FINISHING PLANT.

What It Has Accomplished—Its Advantages—Its Needs for Future Development.

(Contributed Exclusively to COTTON)

BY JNO. W. ARRINGTON, PRESIDENT UNION BLEACHING AND FINISHING CO., GREENVILLE, S. C.

About 18 years ago practically the entire product of Southern looms consisted of coarse, heavy fabrics, a large percentage of them for export and only a small proportion of them being finished. When convertible goods of print cloth yarns and finer became a sufficient factor of Southern production to be appreciable, the need was felt for finishing them at or near the point of manufacture and with this need was born the Southern finishing plant.

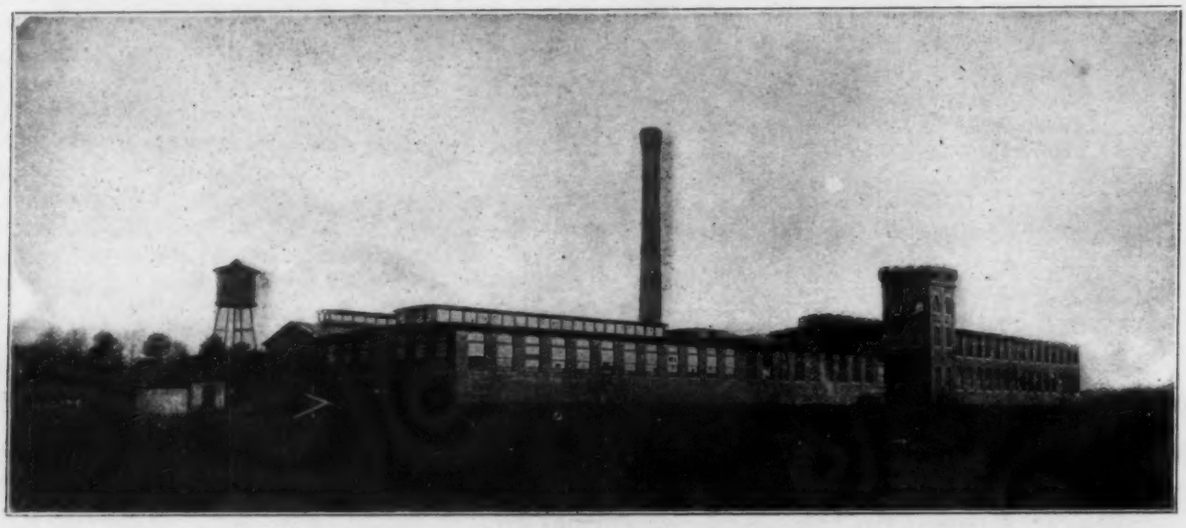
As the South was content for a long time to make only coarse and heavy fabrics, so should be the policy of the finishing plant to attempt at first only the more simple and easy classes of work in their line. The argument most frequently heard against the South as a place for finishing is that the water is not good. Such argument is without foundation in fact. The water generally throughout the South is, I believe, all right, but certainly it is in that mountain section of it with which I am familiar.

The proof of the pudding is said to be in chewing the bag. Such a considerable portion of the converting trade have "chewed the bag" and found out that nobody anywhere is turning out finer finishes than we are in the South, that very little is now heard about our water, and then only from those who have not yet made a test. Turning out such work as we do with the water we have, would not our Eastern friends be in a bad fix as competitors if we had better water?

When cotton manufacturing was in its infancy in the South, it was found necessary to import New England men who had expert practical knowledge of manufacturing, by whom our untrained help could be taught. In the finishing business we have found a similar course doubly necessary. Our superintendent and men in charge of departments, each of them an expert in his line, having all come from the best New England plants. Our own people are intelligent and willing workers. Therefore it is not hard to understand, that such a combination should produce results that are most gratifying.

The first essential to the success of a finishing business is to produce such uniformly good results on the fabric as to obtain the confidence of the converter, that the quality of the work will be satisfactory. These converters have to be shown. Probably every finishing works, no matter where located, has to go through this process of proving its right to exist, which process might well be termed the formative period. During such a period almost all shipments are sample lots, involving a disproportionate cost per yard for finishing. Most Southern finishing plants have pretty well passed through that period and now have among their clients many of the largest and most critical converters in the country.

By far the greatest advantage to the South in this line is the matter of location, meaning thereby the question of favorable freight arrangement obtainable on grey goods purchases, which favorable arrangements are not available if the goods are shipped to Eastern finishing works. Before there was a bleachery in the South and when every yard of the goods had to go to New England to be finished, it was necessary for the Southern mill to deliver its grey goods to Eastern bleacheries in order to compete with the Eastern mills located right at the doors of the plants. They would as soon allow that freight to the buyer as to pay it to the transportation companies. To illustrate clearly how this works: The company I represent is located at a point where there are within a radius of 50 miles upward of 3,000,000 spindles, most of which are making convertible goods. The freight rate from the territory mentioned to New York is 49 cents per hundred and to most Eastern bleachery points is 53 cents per hundred. We absorb the freight to our works on the grey goods, which leaves



WORKS OF THE UNION BLEACHING AND FINISHING CO., GREENVILLE, S. C.

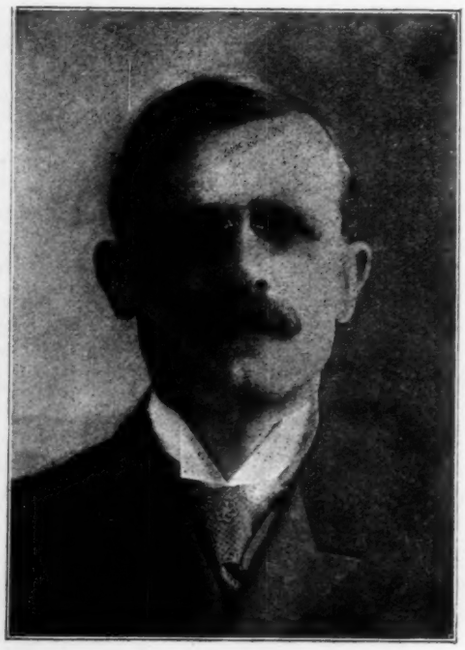
the buyer with freight allowance enough to land the finished goods in Philadelphia or New York.

From this it is apparent that Southern finishing plants are on an equal footing with all the others as to the delivery of finished goods in New York. When it comes to distributing the finished goods in the South, Southwest and West, they have a distinct advantage, as I will undertake to show by the following figures, using the city of Greenville, S. C., as a basis, as only from that point am I familiar with all inward and outward freight rates. In the first column below is shown the rate of 53 cents to Eastern bleachery points, plus the rate from a number of the most prominent of such bleachery points to the several destinations shown. This column, in other words, shows total expense for transportation added to the cost of the goods, when reaching that destination from the South by the way of Eastern bleacheries.

The second column shows the rate from Greenville, S. C., to the several points, and the third column the difference between the two of the actual saving in the freight, in cents per hundred pounds, in favor of Greenville.

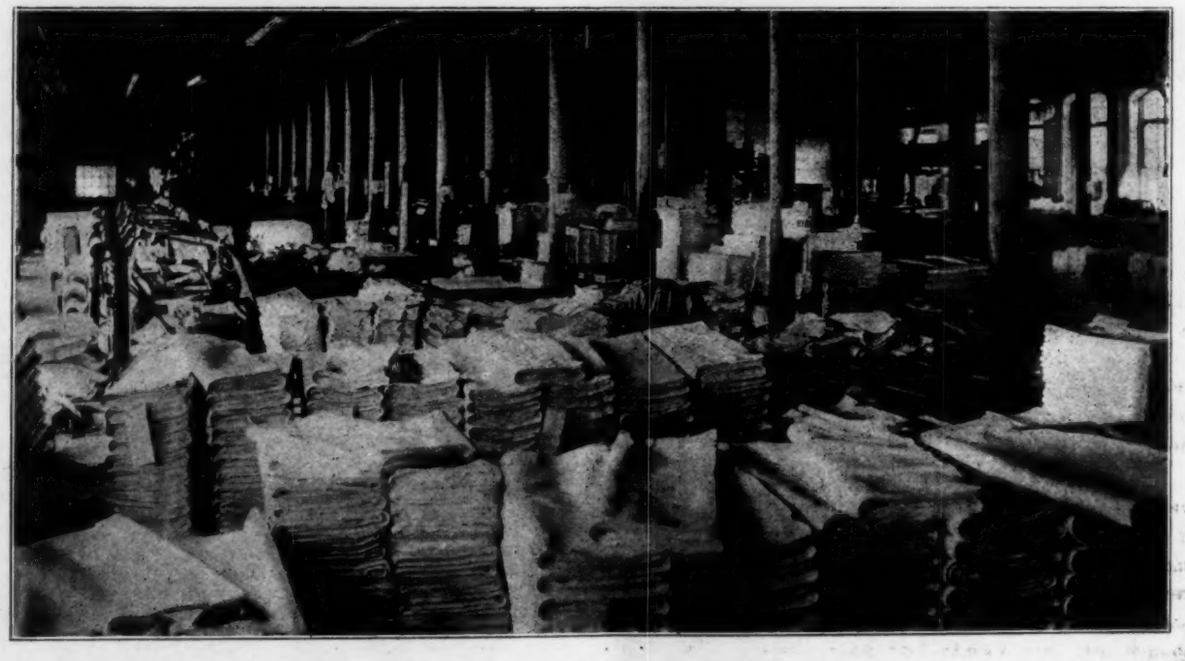
Atlanta, Ga.	$1.27	34	93
Birmingham, Ala.	1.32	43	89
Nashville, Tenn.	1.15	46	69
Memphis, Tenn.	1.25	55	70
New Orleans, La.	1.16	55	61
Galveston, Texas.	1.43	90	53
Chicago, Ill.	1.05	65	40
Cincinnati, Ohio	.98	59	39
St. Louis, Mo.	1.14	60	54
Omaha, Neb.	1.46	95	51
St. Paul, Minn.	1.30	92	38
Des Moines, Iowa	1.40	95	45
Milwaukee, Wis.	1.16	68	48
St. Joseph, Mo.	1.46	95	51
Kansas City, Mo.	1.46	95	51
Troy, N. Y.	.75	54	21

Where there is a rail and water rate lower than all rail, I have used the lower rate in making up this table. Having claimed an advantage to points in the South, Southwest and West, I have grouped the cities named in that manner. For instance, the four points first named are



JNO. W. ARRINGTON.

Southern and show an advantage to Greenville as compared with shipping the same goods to Eastern points for finishing, ranging from 69 to 93 cents per hundred pounds. The next two points being New Orleans and Galveston, which I would call the Southwest, show an advantage to Greenville of 61 and 53 cents, respectively, notwithstanding the fact that they are important ports. The next nine points I would call the West, and they show an advan-



INTERIOR OF PACKING ROOM, SHOWING YARDING MACHINES, PRESSES AND CLOTH READY FOR THE CASES.

tage ranging from 38 cents in the case of St. Paul to 54 cents per hundred in that of St. Louis. Last of all I include Troy, N. Y., which is probably the largest consuming point in this country of plain bleached goods. To this point, Greenville shows an advantage of 21 cents per hundred pounds. The cities I have used for illustration were taken at random and are considered as fairly representing the conditions that prevail at many hundreds of points in these several sections.

Probably the advantages shown can be better realized and more readily appreciated if figured out per yard, as that is the way the goods are bought and sold. Using as a basis the wide print cloth weighing 5.15 yards per pound and using among the Southern, Southwest and Western points named only the two showing respectively the least and the greatest advantage, I find that 38 cents per hundred at St. Paul figures a little above 7/100 of a cent or a little more than 1/16 of a cent per yard, while Atlanta's 93 cents figures above 18/100 or practically 3/16 of a cent per yard. Stated in percentages and using five cents per yard as probably a fair average grey price for the construction mentioned, the two points named show a saving respectively of 1.47 per cent. and 3.60 per cent. The terms on print cloths are well known to be net ten days. At the same price the shrewd buyer would give his business to the man who offered him on all his purchases terms of even one per cent. ten days.

A few years ago when labor legislation was unknown in the South and when manufacturing had not developed so as to cause any scarcity of labor, the hours of work were far longer and the rate of pay smaller in the Southern cotton mill than in those of the East, which gave the Southern cotton mill a so much lesser cost as to threaten the industry in New England on coarse yarns and heavy fabrics. The result of this difference was to drive New England into changing over as rapidly as possible to finer counts of yarns, or where that was impracticable with old established plants, to force them into building additional large and up-to-date plants in the South, which course a number of them followed.

The conditions in most of the Southern states have been undergoing a change in the last few years in relation to hours of work and the rate of wages paid to a much greater extent than in New England, so that today while there may still be some advantage to the Southern mills, it is so slight as to be said not to exist and is probably offset by the greater skill of the Eastern operative, due to longer training. I take the position, however, that such changes in conditions do not apply to finishing works for the reason that our advantage is one of location, of which we cannot be deprived and which cannot be altered. In short, it will always be to the benefit of the owner of the goods to finish them where made, rather than to haul them a thousand miles or more to finish, and then a still greater distance to final destination.

Having devoted this much space to setting forth the advantages of the South, I must not overlook the fact that it also has its disadvantages. There are two features that might be considered possible handicaps, one being the remoteness from the supply of most drugs and chemicals, and the other the fact that we are not closer to New York, though less than twenty-four hours distant. The former of these is easily overcome by carrying in stock a few thousand dollars more of these supplies than would be otherwise necessary, while the other objection is met by maintaining a New York office in charge of a capable man in close touch with the works by wire and telephone.

Another point that has in the past been a source of worry, but that is daily growing better, is the problem of securing experienced operatives. I would welcome more competition on the grounds that the more plants we have, the more business will be attracted to this section and the more plentiful will be the experienced labor which we all require to produce high grade work.

I do not feel that I am indulging in an idle dream when I say that the day is not far distant when a considerable portion of the South's product of convertible goods will be finished where they are manufactured. The inevitable tendency of business is to bring each finished product as close as possible to its raw material. For that reason cotton piece goods must eventually be finished on a large scale where the cotton is grown, ginned, spun and woven.

It has been suggested to me that following out this same line of reasoning, it would pay the converters large returns if they would establish branch selling houses in Charleston or Savannah for handling direct their export trade, making a saving in transportation on both ends. This saving would be still more evident on export trade with the Latin-American countries and after the opening of the Panama Canal, on shipments to the Pacific ports of the Americas' and to the Orient.

Development along these lines would undoubtedly place a much greater volume of business on the books of the Southern converting plants, and necessarily improve the position now held by Southern shipping ports as factors in the export trade of the country. Many Southern manufacturers are already inoculated with these germs of foreign trade expansion and the time is not far distant when the Southern states at a section, will contain textile manufacturing, converting and shipping centers second to none in the United States.

OBITUARY.

It is with great regret that the many readers of COTTON and the many friends of James B. Loflin, late superintendent of the Lydia Cotton Mills, will learn of his death in Kenosha, Wis., on the night of Thursday, July 6th. Mr. Loflin was considered one of the most able superintendents in the South, having held very important positions with many mills in South Carolina. He was connected with the Pelzer Mfg. Co., of Pelzer, S. C.; he was the first superintendent of the Orr Cotton Mills, at Anderson, S. C.; the first superintendent of the Gluck Mills, at Anderson, S. C.; and at the time of his death was superintendent of the Lydia Cotton Mills, of Clinton, S. C.; each change being one of promotion. He was buried in Augusta, Ga., on Sunday afternoon, July 16th, and is survived by his wife, who was Miss Jennie Knox, of Chicago, Ill. Handsome floral tributes were forwarded by the overseers and operatives of the Lydia Cotton Mills and his many friends in Clinton, a number of whom attended the funeral at Augusta.

SOUTHERN TEXTILE ASSOCIATION.

"Greenville—The Gateway to Get There," was the slogan that greeted the eyes and ears of each of the several hundred members and guests who attended the July meeting of the Southern Textile Association, at Greenville, S. C. The omnipresent enthusiasm of E. B. Adams, the genial secretary of Greenville's Board of Trade, seemed to communicate itself to the association members, and the greatest interest was evinced in the program. There was not a dull moment at the whole convention, and the hours between the morning greetings of the early comers and the departure of the special cars around the "Belt Line" about midnight, were crowded with technical discussions and social goodfellowship.

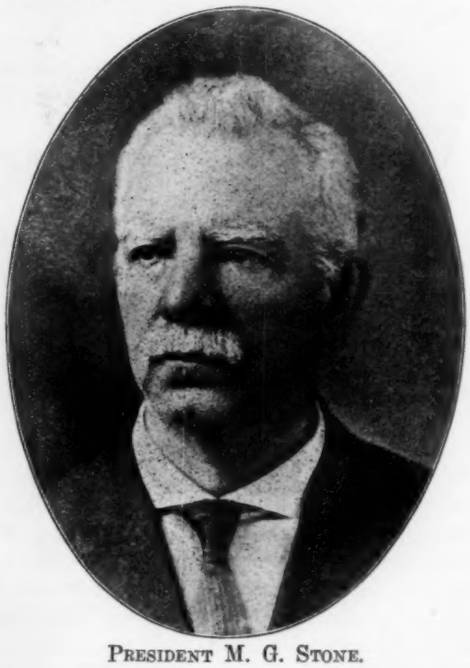
The earlier portions of the day were spent in sightseeing among the Greenville mills and in getting acquainted with other visiting members from other sections of the South. Promptly at 2 o'clock the first session was opened by H. J. Haynesworth, president of the Greenville Board of Trade, who welcomed the visitors to the city in behalf of the Board of Trade with a few happy remarks. Mr. Haynesworth then introduced J. B. Marshall, the mayor of the city, who in his turn welcomed the members of the association in the name of the city of Greenville.

The third address was delivered by Thomas F. Parker, president of the Monaghan Mills of Greenville. Mr. Parker said in part: "I come to extend to you a welcome from the mill presidents and superintendents, the overseers and operatives of Greenville. You have been told that this is the gateway to get there, but I want to tell you what is also true, that this gateway is founded on cotton manufacturing; is built and sustained by cotton manufacturing; and it is therefore with especial pleasure that you, who are cotton manufacturers, are welcome here. The business houses around you, the railway systems that come here, the banking concerns and other business institutions here, are but by-products in the same sense, because it is manufacturing that is making Greenville what it is to-day. It is cotton manufacturing that is attracting others here and keeping them here and building up our city along all lines.

"You have come to a town of fellow workers. You have come to a town which is the mill center of the South. Within two miles of where you are sitting, 600,000 spindles are humming; 12,000 looms are weaving. You will find a bleachery, a waste mill, cotton goods jobbing houses and other representative business investments representing a cost of $13,000,00. Our cotton mill pay rolls alone annually are about $2,000,000. Our mill dividends annually are one-half a million dollars. You are in the home city of the presidents of 43 mills. The spirit of Greenville is something which is manifested in the way in which our mills co-operate with each other, manifested in the way in which our presidents, superintendents, overseers and operatives work together for our common success. We share our success with each other. We believe that nowhere in the South will you find collected together 7,000 people such as compose our mill operatives, who have made greater progress in the last few years, or who offer to their children more substantial advantages than they have here. We believe that we have an exceptional class of people in this respect and representing them as much as any of the others, I give you a cordial welcome."

Mr. Hamrick, the president of the association, said that he had experienced considerable difficulty in finding a man who was willing to respond to three addresses of welcome. They did not object to one address or even two addresses, but they did think that a response to three addresses was considerable of a tax to place upon a man on such a warm day as July 1st was in Greenville. However, he continued, he had finally secured W. L. Lowry of the Monroe Cotton Mills, of Monroe, N. C., to accept this part of the program.

Mr. Lowry said that a more suitable place for a meeting of this kind could hardly have been selected, as within a radius of 100 miles was to be found three-fourths of the spindles of the South and that Greenville was in many ways a pioneer in the Southern cotton manufacturing industry. "Not only is this an important manufacturing center," continued Mr. Lowry, "but it is a leader in other various branches of business industry. It stands for the best of everything and has taken the lead in colleges,



PRESIDENT M. G. STONE.

churches, manufacturing and other enterprises. As its citizens are ever ready to help advance and build it up, we predict for it ever-growing importance and prosperity. Greenville and the Southern Textile Association alike have just cause for much pride in the stand the mills of this city have taken in bettering the condition of their employees and we believe that we are justified in stating that here can be found the model mills of the South in this respect. We are proud of this stand your city has taken, but when we come to think over the matter and to know that for years it has been the leading educational city of its size in the South, we can readily see how the desire for the advancement of the cotton mill operative was inspired and put into execution, as education and advancement of all kinds walk hand in hand. We feel especially proud that you have seen fit to give this body of men, made up mostly of those who have reached their present positions by hard work and by close application to their

duties, many being handicapped by an absence of early training, such a generous welcome, and we feel that this is a sure token of the esteem in which the men who do the work are held."

The next thing on the program was the address of President Hamrick, but Mr. Hamrick said that as the weather was so warm, the program committee had requested him not to make any annual address, which remark created considerable amusement, and under cover of the laugh which followed Mr. Hamrick introduced the next speaker, J. E.

J. M. Davis, First Vice-President.

Cheesman, of New York, who read a paper entitled, "Opening and Cleaning of Cotton."

The next speaker on the program was Eugene Szepesi, who read his paper on "Waste Utilization." During the course of this paper he exhibited a number of samples of cloth that are manufactured from cotton waste in some form. Mr. Szepesi spoke in part as follows:

"Taking our cotton consumption in the United States to be about 4,500,000 bales, a reasonable deduction is that the waste having a utilization value amounting to about 8 per cent of the original consumption, would amount to 180,000,000 pounds. According to the government statistics, about 40,000,000 pounds of this has been exported to Germany and England. Taking the average value of the cotton waste to be about 4 cents per pound, the 120,000,000 pounds assigned for domestic consumption would bring to American manufacturers about a half of a million dollars. Lacking authoritive statements, I could not obtain actual figures, but I find it reasonable to state that the American manufacturer does not get two-thirds of this amount through the indifference and improper handling of the waste. The one-third of our yearly production of waste which goes to Europe and is manufactured into marketable articles will bring the German and English manufacturers, according to my estimation, more than the American manufacturer gets for his cotton waste from the American consumers. What is the reason of such conditions? The answer is clear: the lack of proper utilization.

"I had an opportunity to examine the waste of several American mills and found out that the value of the waste has been artificially decreased by the improper handling in the mill. Now let us consider the way in which this cotton waste is utilized in the United States and how it is utilized in England and Germany. Our cop waste is readily absorbed by the railroads for wiping purposes. In the way they use it the actual efficiency of this waste never reaches 70 per cent and in many cases is as low as 30 per cent. If this waste could be handled in the way it is done in England and Germany, especially in Germany, the value of service of the wiping waste would be increased from 150 to 200 per cent over the present efficiency, or, summing it up, two-thirds of the waste consumed by the railroads to-day could be utilized for other purposes. I felt considerably chagrined when on my last year's visit to Germany a cotton waste manufacturer showed me a wiping cloth for which he received a good-sized order from the United States. This cloth was made of cotton waste which had been imported from the United States, put into a marketable article and sent back to the States again with its value increased almost 200 per cent per unit, which entire amount went to the credit of a foreign manufacturer.

T. B. Wallace, Second Vice-President.

"Once I was cornered by a German waste manufacturer with the question, 'What are your methods for utilizing cotton waste?' I had to confess that our methods are to get rid of it as a burden. We have several manufacturing concerns who manufacture cotton waste into marketable articles. They are making a success of it, but they don't utilize one-tenth of the total material at their disposal. A well-known article made of cotton waste is the teamster's glove, of which I bought a pair for ten cents and the manufacturer of which introduced with this article a very desirable product. Another article which is converted from cotton waste in the States to-day is a soft twisted yarn utilized for cheap fleeced underwear. It is a success, too. The wiping mops are well known to us. That is about all the American waste manufacturer is bringing on the market.

"Now let us see what the English and the German manufacturer is doing with the cotton waste. Here I have a sample taken from a cheap curtain, the warp of which is a low grade India cotton and the filling cotton waste. This curtain could be produced in the United States cheap enough to make it popular. Every one of us is familiar with the law of supply and demand, according to which the demand for a certain article increases in proportion to the decrease of cost of production. In our industrial as well as rural district, 90 per cent of

J. S. OSTEEN, THIRD VICE-PRESIDENT.

the population has a limited pocket-book. There are many millions who have artistic sense and would appreciate a portier or couch cover, but they cannot afford the price to-day. If I could produce a couch cover or a table cover at 50 cents apiece I know I could sell many, and how many are here to-day who are paying a certain price for a certain article who would not be glad to pay less for it if an opportunity was given them. Another interesting article which can be used for cheap house decoration purposes, has a filling of the lowest grade of waste, which has been bleached and filled with China clay to such an extent that it makes my hands white, is extensively used in Italy. With some alteration a very cheap but still serviceable bed cover could be easily made and find a ready market in the United States. Another bed cover of a honey-combed texture would find a ready market. Flannels with cotton waste filling if properly manufactured could be made sanitary as well as serviceable. Carpets are to a great extent manufactured of cotton waste, then printed and sold for a song.

"The opportunities to-day for cotton waste manufacturing are almost unlimited. It would not be a venture of a questionable success. We have examples before us of how a big industry has been built up in Germany and England from cotton waste, bringing returns which make the industry one of the most desirable. A great objection toward articles manufactured of cotton waste has been that it has a disagreeable odor and is unsanitary. This objection is to-day overcome, as when the waste is dyed, bleached or handled with a disinfectant solution, cotton waste is no more unsanitary than a shoddy which goes through the manufacturing process. German cotton waste is also used for apparel fabric, having a finish like a woolen fabric. This article could not be considered for the American market, as we are the best dressed nation in the world and there is no necessity for the introduction of such articles.

"Certain large cotton manufacturers in the New England States are on the right road. They have established several cotton waste utilization concerns which no doubt will prove successful in obtaining a better price for the waste.

"For the Southern manufacturers an organization of this kind, but more intensive, would be the right thing. They have the cotton waste; they have the market within their own limits, and it would only be a matter of co-operation to realize a desirable profit from their waste products. The number of articles which could be manufactured from the waste are numerous. The field is almost unlimited and sooner or later it will be realized that the field is large enough to assure a success of such undertaking."

The next paper on the program was "The Construction of the Cotton Card," by Prof. Fred Taylor, of Clemson

E. E. BOWEN, FOURTH VICE-PRESIDENT.

College. Mr. Taylor's interesting paper was followed by Z. H. Mangun of Gibsonville, N. C., who read a paper entitled "The Weave Room." Mr. Mangum spoke in part as follows:

"In this article we want to confine our thoughts to the weaving of cotton cloth and particularly such classes of cotton cloth as are made in the South. In the first place we will assume that the yarn comes from the spinning in a first-class condition, and I want to emphasize now that too much cannot be said along this line, for it is well known that when the yarn comes from the spinning in any other condition the weaver is the victim of circumstances which he cannot overcome. On the other hand, the yarn may come from the spinning in a first-class condition and then so treated in the preparatory process that the weaving will be equally as bad as in the first place. This being so, it will be necessary for us to

confine our efforts to the things which we can partially regulate ourselves. In the first place the warp should be properly sized, but since this is a broad subject in itself, I shall not attempt to give any formulas along this line. The sizing, however, will depend to a great extent upon the class of goods being made, upon the finishing process, as to whether the goods are to be bleached, dyed, napped or otherwise treated, as well as the purpose for which the goods are to be used. We would not size a hard twist yarn just like we would a soft twist, neither would we size a warp for a soft finish the same as we would for denims, tickings or similar fabrics; therefore, it will be necessary for each individual to work out his formulas to suit his special case. We will now consider a few points of special vantage in the weave room.

"The room should be correctly lighted insofar as is possible and the atmospheric condition looked after so far as to conform with the best running of the work. I will state, however, that the humidity in the weave room should

David Clark, Treasurer.

be regulated to suit conditions that otherwise could not be changed. That is, where very heavy sizing is resorted to, it requires more humidity than for a light sizing, everything else being equal. At the same time very few weave rooms are hurt by having too much humidity, inasmuch as the yarn is tightly wound on beams and this nearly always when the yarn is hot and therefore does not contain its natural moisture. The yarn in this condition has no way of taking in moisture, and since so little of the yarn is exposed to the atmosphere of the room, it is necessary to have what would otherwise seem to be an excessive amount of humidity. With the humidity registering from sixty-five, and for certain classes of work up to eighty, you will get far better results than with any lower degree, the yarn will be more pliable, the fibres clinging close together producing a smooth, strong thread that will withstand the strain in the process of weaving, without chafing or wearing the yarn to a degree that it will break. Again, when the yarn wears it necessarily makes that much fly which is suspended in the air and inhaled by the operatives, while with sufficient humidity the tendency would be for all foreign matter to settle and remain on the floor. It is not only necessary for the overseer to know what is best for the room in general but he must know the loom, for the timing and setting of a loom is of vital importance, not only in saving power, but you can take a piece of cloth of the same construction and made of the same yarns and so time the loom that there will be a marked difference in the appearance of the fabric. You can regulate your whip-roll and time the harness motion to such an extent as to produce a face on a plain woven fabric or to produce a fabric with a soft, smooth side, one that will not show what is known as reed marks but will equally distribute the warp ends in such a way that it will not appear to have drawn two ends in one dent of reed. By changing only the timing of the harness motion you can change the appearance on the face of a twilled fabric to such extent that even though two pieces were made from same warp and filling it would appear to be differently constructed. Therefore, to accomplish the best result in weaving it is necessary to have a good man at the head. Not only a man who is an expert weaver, for you frequently get this in a loom fixer, but one who can and will organize the room to the best interest of both employer and employee.

"In putting a warp upon the loom you should satisfy yourself that everything is done that would benefit the weaver. The harness should be hung right, that is, not so tight as to produce a jerk and cause an excessive amount of warp breakage, of unnecessary friction, of wear and tear and numerous other faults, but loose enough to run well and not to offer unnecessary resistance to the weaver when piecing up broken ends. The loom reeds should be of a depth necessary to permit the proper opening of the shed without coming in contact with the upper edge of reed when the shed is at its greatest opening. However, the shed should be open just enough to permit a free and easy passage of the shuttle in its flight from side to side and the lower half of the shed should just clear the race plate. This will prevent any unnecessary chafing of the warp and shuttle.

"It is too well known for me to even mention the results as to breakage and wear and tear of the loom, but I want to emphasize the waste in power. For instance, we take a room of one thousand looms and assume that it will require one-quarter to one-third horsepower per loom. In the first place, take the loom of one-quarter horsepower and add friction till it requires one-third horsepower; this will give an increase of 83 horsepower in the room. In the second case add friction to the one-third horsepower till it requires one-half horsepower and then you have an increase of 167 horsepower. Now, suppose it cost $20 per horsepower per year, the first room would be wasting $1,660 per year and the second room would be wasting $3,340 per year. Besides this loss of power there is that of thread waste which is still greater, caused by the excessive amount of power from the picker stick on the one hand and the right stop of the shuttle on the other. Especially is this true where soft yarn is used. This item of waste is one of very much importance when made from high priced cotton. The majority of the waste in the weave room is filling yarn and in nearly every case can be reduced to a minimum. It is therefore necessary for us to keep diligent watch over this great leak and stop it, as we will then have accomplished one of the most important things in connection with the successful running of the weave room.

"Another item of waste is where the fixers cut out the warps before the beams are entirely empty, that is, they leave some yarn on the beams that could be woven into cloth. Closely associated with this waste proposition should also be included that of cleanliness. There is no question in my mind that where the room is kept clean it is more sanitary and at the same time has a tendency toward bringing out better qualities in the help."

At the conclusion of Mr. Mangum's paper, Mr. Adams announced in behalf of the Board of Trade that several special trolley cars were waiting outside the building to convey the members and visitors around the "Belt Line" and among the numerous cotton mills that surround Greenville. Before entering the cars, however, the members lined up on the side walk opposite the convention hall, where they were photographed in a body.

The trip on the cars passed through the villages of the F. W. Poe Mfg. Co.; the American Spinning Co.; the Monaghan Mills; the Woodside Mills; and the Brandon Mill. The new Westervelt and Dunean Mills in process of erection, the Camperdown Mills, the Mills Mfg. Co., and the plant of the Union Bleaching and Finishing Co. could all be seen in the distance from the cars while on this trip. Each car had one person who was acquainted with Greenville and vicinity to act as a lecturer during the trip and he gave information concerning each mill and its capacity, who its officers were, etc., for the benefit of the visiting strangers who chanced to be in the car.

EVENING SESSION.

The meeting for the evening session was called to order by President Hamrick, who introduced James L. Carbery, of Washington, D. C., to read a paper on mill villages. Mr. Carbery said: "It is unfortunate that so many persons do not know how to transplant a tree, nor to set out the simplest vegetable, or how to prepare the best of the seeds of the common plants which give everyone so much satisfaction, either from the beauty of their blossoms, or from their value as food." Mr. Carbery indorsed this kind of improvement among mill villages and indicated that he found the people very ready and willing to go to considerable trouble themselves to beautify their homes and surroundings, if they were just given a little of the proper instructions that would teach them to lay out their plants in pleasing designs and to select the best varieties for the work at hand. He said that even the school garden would be an essential part of this program and that the lessons learned there would be quickly reflected in the improved methods of cultivation about the village homes. In closing he invited any doubting members of the association to visit the homes and gardens at the Monaghan Mills to convince themselves that they were wrong and he was right in his contention in regard to the improvement of mill villages through the proper preparation and upkeep of gardens.

Mr. Hamrick called upon Lewis W. Parker, who was present, to say a few words to the association in comment on Mr. Carbery's paper. Mr. Parker said he sincerely hoped that the line of work which Mr. Carbery had undertaken would go on throughout the mill villages of the South and do for the mill operatives just what the department of agriculture has done for the farmers, that is to go far toward making the people of the South have more comfortable homes and enjoy a life that is sometimes hard, encourage them to have nice gardens, both flower and vegetable gardens, and make them feel that it is a part of their interest as well as that of the corporation to develop them in every way possible and in every way add to the comfort and good mode of living.

At the close of Mr. Parker's remarks the president called for nominations for the ensuing president, which were made. While the tellers were counting the ballots on this election, Mr. Escott read the report of the secretary. The treasurer's report was then read by David Clark, of Charlotte.

The next business before the meeting was to decide the meeting place for the fall convention and suggestions were called for by President Hamrick. Ralph Webber, the Atlanta representative of the Saco-Pettee Company, suggested that Atlanta be the next meeting place for the association. He was ably supported by David Clark, of Charlotte, J. M. Davis, of Newberry, S. C., and others. Ashville, N. C., and Columbia, S. C., were also suggested, but the association finally voted almost unanimously to hold the next meeting of the association in Atlanta on the last Saturday in November of the current year. The following resolutions were then read and adopted unanimously by the convention:

"We, your committee on resolutions, beg to submit the following:

"Resolved, That this association extend its thanks to the city of Greenville; the members of the Board of Trade; the entertainment and reception committee; together with the local superintendents and overseers; for the many courtesies extended the association during this convention and for the splendid entertainment furnished.

"And be it further resolved, That the thanks of this association be extended to Messrs. Haynesworth, Marshall and Parker for their happy addresses of welcome and to other speakers who took part in the program."

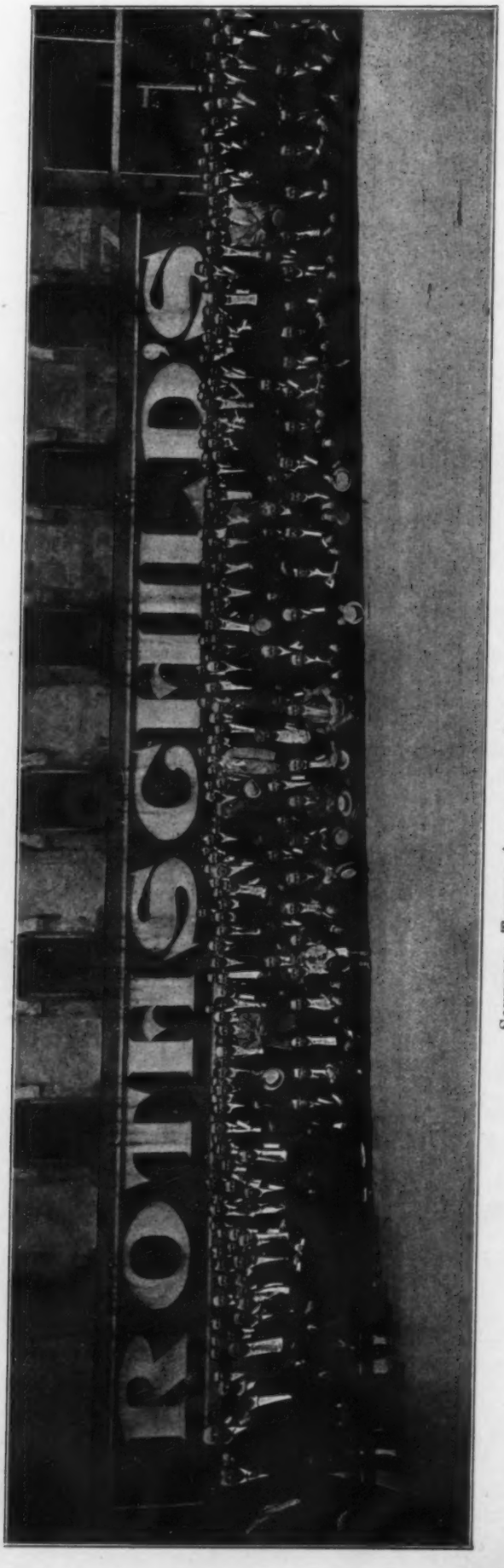
(Signed) L. L. ARNOLD,
G. GRAY SIMPSON,
J. M. DAVIS,
Resolution Committee.

T. A. Sizemore, chairman of the entertainment committee at Greenville, took this occasion to thank the Board of Trade and representatives of the different machinery and supply houses who center at Greenville, for their hearty cooperation in entertaining the members of the association while in the city. C. F. McCall then nominated the following program committee for the next meeting, who were elected: David Clark, G. S. Escott, Arthur Hamilton, G. Gray Simpson, and L. L. Arnold. The officers of the association for the ensuing year are as follows:

President—M. G. Stone, Spartanburg, S. C.
First Vice-President—J. M. Davis, Newberry, S. C.
Second Vice-President—T. B. Wallace, Greenville, S. C.
Third Vice-President—J. S. Osteen, Greenville, S. C.
Fourth Vice-President—E. E. Bowen, Rockingham, N. C.

G. S. Escott, the secretary of the association, and David Clark, the treasurer, both of Charlotte, N. C., were unanimously re-elected to their respective positions. There being four expirations on the Board of Governors, the following were elected to fill the vacancies: M. O. Alexander, Greenville, S. C.; W. M. Sherrard, Easley, S. C.; J. Y. Jones, Newberry, S. C.; J. O. Edwards, Pell City, Ala.

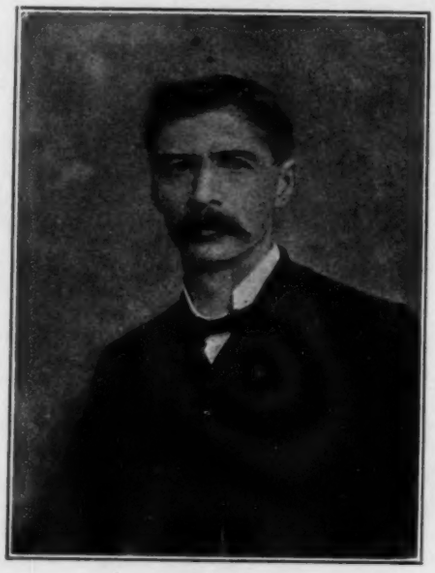
The last feature of the program was a paper by J. P. Judge of Baltimore, Md., enittled, "The Electrical Specialist in the Cotton Mill," and was illustrated with a very large number of views thrown on the wall with a stereopticon.



SOUTHERN TEXTILE ASSOCIATION, GREENVILLE, S. C., JULY 1ST, 1911.

At the close of the program for the evening a banquet was served in the rear of the convention hall, after which the members departed to their respective hotels or homes.

The general consensus of opinion at the close of the sessions seemed to be that the Greenville meeting was an unqualified success and that Greenville's representatives



G. S. ESCOTT, SECRETARY.

did themselves proud. The parting slogan of the convention, however, and one that ended practically every conversation that was heard at the close of the meeting was, "I'll see you in Atlanta next November."

PAPER VERSUS COTTON DUCK BAGS.

In reinforced concrete work there are a great many details which have been carefully investigated by construction companies that realize the value in doing so. Too often the case in question is considered unimportant. For instance, take the question of whether it is better to use cement in paper bags or cotton duck sacks. It would seem that it would hardly make any difference, but the Aberthaw Construction Company, of Boston, have made repeated experiments in using cement in paper bags and have found that, in general, cotton sacks are the most desirable, for various reasons. In the first place the paper bags cost a trifle more in the first intsance than cotton, even when all the latter are recovered, and their experience is that between 3 and 5 per cent of the cotton sacks get lost or are non-returnable. Secondly, the loss of cement in paper bags is very large, especially when there is more than one handling from the car to the mixer. Finally, in case additional airing is necessary, which is very often the case when the cement companies are shipping hurriedly during the busy season, the heat is retained in paper bags to a greater extent than in the cotton.

Capt. A. Caruana, Strada Reale, Valetta, Malta, the largest dealer in men's furnishing goods in the Maltese Islands, has just received his first consignment of American suspenders, ordered as a result of trade opportunity No. 6191 sent from the Bureau of Manufactures, Washington, D. C. Merchants here tell me that this is the first order given for American suspenders in Malta.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

(Special Correspondence.)

Readers of COTTON are familiar with the provisions of the Underwood Cotton Revision Bill, recently offered in the lower branch of Congress, and reported in the daily press. In the face of such drastic tariff tinkering manufacturers, not only of the South, but of New England as well, are up in arms, and doing all in their power to prevent the passage of the bill.

R. M. Miller, Jr., of Charlotte, is chairman of the Tariff Committee of the American Cotton Manufacturers' Association. After he had carefully read the provisions of the proposed revision bill from the text, rather than the terse newspaper reports, he issued a statement, which is a strong protest in the name of the manufacturers, as well as a strong appeal to American labor.

Mr. Miller declares that if this bill is put into effect it will be necessary for American manufacturers to reduce wages from 25 to 50 per cent. in order to compete with imported yarns. He charges that the proposed bill favors foreign interests rather than home manufacturers. Here is his open statement, just issued:

"The so-called Underwood bill on the revision of the cotton tariff schedule is a bill formed, apparently, solely in the interest of the importer and foreigner—wholly unfair and unjust to us, ignoring entirely the interests of the American cotton manufacturer, and the American laborer, and if enacted into a law, will, 'turn the cotton mills of our country into soup houses.'

"Based upon today's prices of cotton yarns, as best that I can figure, in order that the manufacturers in this country may meet the reductions in the proposed schedule, and to compete with imported yarn, it will necessitate a cut of somewhere from twenty-five to fifty per cent. in the wages of our cotton mill operatives. This means pauper wages to our American labor to meet the pauper wages of Europe. Will American labor stand for it? The American cotton manufacturer protests against it."

When the Tariff Committee of the American Association met recently in Charlotte, strong resolutions were adopted endorsing the correspondence which Mr. Miller had had with Chairman Underwood, a resume of which is given in another part of this issue. Congressman Webb, of North Carolina, in the democratic caucus, preceding the introduction of the Underwood bill, made a strong plea for the manufacturers, and against the proposed sharp cuts in schedules. He pointed out that this bill, if passed, would greatly reduce, and thereby greatly injure the products of manufacturers, but that with other tariffs untouched those articles which manufacturers must buy are highly protected. He insisted that the cotton schedules remain as they are until a reduction is made in all products which manufacturers must buy. Against the manifest discrimination he vigorously protested, but the caucus bill was offered, the majority of the democrats backing Chairman Underwood strongly, regardless of facts, figures or common sense.

July has been characterized by drastic and general curtailment. Instead of improving, conditions have degenerated into an unsettled and unsatisfactory state, and short time policies have become a matter of necessity. Price offerings have not been such as to justify full time work and mill men have taken the only course left to them, and have shut down their machinery largely, rather than to continue operations at a loss. Beginning with the first of the month regular curtailment began. In South Carolina it is estimated that three million spindles were idle for at least one week. Many of the larger mills closed down for ten days, and some of them for two weeks. This action followed an agreement reached some time ago by the South Carolina Cotton Manufacturers' Association to curtail two weeks in July and two weeks in August. In North Carolina, in Gaston county alone, forty mills closed down for from one week to ten days. And throughout the manufacturing sections of the South the story is the same.

August, too, will be signalized by heavy curtailment, that is unless the unexpected happens and trade conditions improve to a material extent. From the standpoint of the operative, summer months are preferred for short time work, since hardships attendant upon enforced idleness are less serious. Then, too, from the manufacturers' standpoint there is less danger then of a disorganization of mill forces.

The vacillating nature of the cotton markets has had much to do in keeping the goods trade in a state of turbulence. Uncertainty as to the size of the coming crop, and the price it will command, has also played its part in the unsettlement of general conditions. Then, too, fear of strenuous tariff tinkering has caused no little uneasiness among spinners.

With the tariff question settled, either for good or bad, the price of the coming crop nominally fixed, and its size estimated, and with the passing of the usual summer dullness it is the belief of many that a new era of prosperity will be ushered in. Trade conditions are bound to improve by fall. The bottom has been touched. The steady and heavy curtailment has cleaned up the accumulation of stocks to such an extent that there must of necessity be a demand for what the mills can turn out later on, and that at good prices.

It is a fact not unworthy of mention, however, that despite the hard times now existing in every channel of the textile industry, reports for the first half of the year show that there has been no falling off in the record of mill construction work. Many new spindles have been added to the South's equipment; numerous established plants have spread out and enlarged in anticipation of the business which they confidently expect to follow this period of depression. Capital has not hesitated to be expended in new mill equipment.

The July 1st dividend record shows to an extent what the strain of two years of hard times has meant. Many mills in all parts of the South which have heretofore never failed to declare regular semi-annual dividends, declared none this year. It is true, on the other hand, that many did. An example may be cited in the case of Greenville, S. C.

Dividends declared by mills in that vicinity on July 1st aggregated a sum of about three hundred thousand dollars. Some of the larger mills have never failed to declare their regular dividends, but there has been an undeniable shrinkage in the general dividend amount.

Export trade shows signs of improving, and this is gratifying to the many Southern mills which make goods for export. Reports made public some time ago show a material improvement in demand from China and other countries. When it is remembered that in the past two years Southern mills have lost over $16,000,000 because of the cessation of trade with China alone, any evidence of a revived demand from that source can be appreciated the more fully.

NEW ENGLAND MILL SITUATION.

(*Special Correspondence.*)

The falling off in trade in cotton goods which began after the last flurry in May and June, became very pronounced just before July opened and since that time the depth of depression has been touched in the New England cloth and yarn mills. At this time it seems as if relief coming from lower priced cotton is in sight but at the same time there is a very light demand for merchandise and the prices offered give very little encouragement to manufacturers. Curtailment in the first ten days of the month was the most extensive known in recent years in New England, it being estimated at one time that fully 50 per cent. of the spindles were idle.

Goods on order for fall delivery are being shipped steadily and the very fair business booked in the early part of the year on blankets, domestics, canton flannels, and flannellettes, has been holding without cancellation. On some cloths scarcity is now being complained of but buyers are not willing to pay prices warranted by the cost of actual cotton for additional deliveries and the mills are confining their output to orders and to the well defined needs of the trade. Orders on fall ginghams have not come up to expectations and some of the large plants are curtailing steadily, fearful of the effect of any accumulations from high cost raw material.

There are some mills that have run in full but they are exceptional and there are a few concerns that have run full time but with a limited amount of machinery in operation. Rhode Island mills have curtailed less than mills elsewhere, and some quilt mills, and fine fancy goods mills making specialties, have managed to keep busy. On the whole, however, the best equipped and best managed mills in this section have been forced to shut down some part of the time.

At this writing the mills have not begun buying future cotton although prices on late deliveries in the future market have become tempting. The difficulty that is facing merchants and manufacturers is the one of anticipating lower cloth prices when actual cotton is costing relatively more than the prices now current and warranted for goods. It will be three or four months before the mills can get the cotton that is now quoted in future markets around 11½ cents and for the moment there is nothing in sight to warrant an early demand for merchandise that will accentuate the limited supplies that may be drawn from.

The action of the large buyers in New York during the month was keenly disappointing to the trade. Jobbers did not show any desire to anticipate their needs and there was little or no opportunity for mills making staples to predicate future operations on any reasonable basis of values. On July 17th, about five weeks after the date to which the old prices of Fruit of the Loom had been pegged at 8¾ cents, a drastic revision of ¾ cents a yard was announced to apply to goods in hand. This move was made at the time the leading jobbers of the country were in the New York market, and at about the same time Marshall Field & Co. announced 1 cent a yard reduction on Fruits, and 3 cents on Pepperell le-4 bleached sheetings. Hill 4-4 bleached, and Masonville 4-4 bleached, were reduced early, but no move was made on Lonsdales or other popular brands for nearly ten days. The jobbers left the market without placing any orders of consequence and since their departure cotton has been dropping steadily.

Another feature of the month was an announcement by the American and Algonquin Printing Companies of a withdrawal of all price restrictions from staple prints. This move resulted in the appointment of a committee of jobbers to wait on selling agents to ask for a reinstatement of the restrictive and protective policy of distributing this class of merchandise. It developed that legal advice had been sought and left no alternative to agents except the abandonment of the restricted prices, but on Friday the 22nd inst. it was announced that protection on the goods would be continued.

Added to these merchandising complications, the whole industry was affected by the offering of a new tariff schedule affecting cotton goods by Senator LaFollette, and later the announcement came of the intention of the democratic majority in the House to revise the cotton and yarn schedules in a drastic way. Thus the actual situation at the moment is that cotton mills are being hampered by a light demand for their output, by a threatened revision of the tariff which has little or no relation to the protective system that has prevailed in the country for years, by liquidation in the cotton market, and by the menacing difficulty of trying to adjust the differences arising from high cost cotton goods and low cost cotton which seems to be in sight.

The unsettled condition is shown by the passing or cutting down of dividends in some of the best equipped corporations in this section. The prolonged dullness has served to exhaust the surplus accounts that many mills had built up in the years of 1905-07, and until there is a further adjustment in the relations of cotton and cloths by which a margin for profit becomes possible, treasurers do not see how they can undertake to meet the market revisions in prices that buyers are calling for.

A month ago it looked as if the fine goods end of the trade would pull out of the depression quickly as the demand for certain lines was good. But the converters who went to their trade with sample lines failed to get any broad action on them and reorders have been small. Prices in this quarter of the market have been falling away, so that the 30-inch 88 x 80s, 11.35 yard goods that had been held at 5¾ cents in the middle of June closed July at 5¼

cents and with very limited trading possible. There has been some fair business booked on fine shirtings and fancy voiles and other sheer fancies, but the bulk business on lawns, linons, batistes, and other staples in combed yarn fabrics has fallen short of most expectations.

Mills making silk and cottons in fancies of many descriptions have been getting a fair spring business. In some respects the business on these cloths has been better than the trade in the fine fancies of all combed yarns. The new lace mills are getting business and the leading quilt mills have sold their output through November. The printers have been running about 60 per cent. of their equipment, and the jobbers in the bleacheries have been doing a fair business on specialties. But on the whole there has been little comfort for anyone in the situation.

The new Sharp mill at New Bedford has begun operations. It will start with about 50,000 spindles and will ultimately have 90,000. The Charlton mills at Fall River are not being pushed very hard and the new Pilgrim mills at Fall River are being constructed slowly. The extensive changes that have been planned for some time in the Dwight mills at Chicopee are being carried out and will be completed by November.

The mill machinery concerns are still running short time with limited forces employed and have not yet begun to see daylight out of the prolonged dull spell. The Pocasset Manufacturing Co., Fall River, has given a further order for 180 Draper looms to supplement the 400 that have been tried out under all conditions in this concern for four or five years. Mill stocks have been held remarkably steady in view of the general attention which has been directed to the investments through the passing of dividends and the tariff agitation. In most respects the industry shows greater stability than it has manifested in any depression in recent years. Up to this time there has been no talk of liquidating labor costs, but in the improbable event of the suggested tariff bills being approved by the President a cut in wages of all employees is certain to result.

MONTHLY REVIEW OF THE COTTON MARKET.

BY H. AND B. BEER, NEW ORLEANS.

One month ago the world was very much concerned regarding the fate of the growing cotton crop, which, at that time, was hanging in the balance. Responding to the demand of the trade for a very large crop of American cotton, the South, ever faithful in its duty and in principle, laid down plans for the making of a record crop, weather permitting. The largest acreage in the history of the country was pitched during the spring of the year, the increase being estimated at 4.7 per cent over the acreage of one year ago, the total acreage sown being placed at 35,004,000 acres, compared with 33,410,000 acres last year.

Everything progressed smoothly until the record-breaking weather, unusually hot and dry, commenced to tell on the growing plant, especially in Texas and Oklahoma, and in the Carolinas. The month of June proved to be a very trying month for the crops of the Southwest, corn having suffered most for want of moisture, to such an extent that little more than a half crop will be made in Texas and Oklahoma. Cotton, however, held its own, the dry weather in June permitting the plant to develop a fine "tap" root by reason of it seeking the reserve supply of moisture provided by the heavy rainfall in April. The plant west of the Mississippi River had about reached the limit of its endurance, however, and it was the coming of beneficial general rains during the month of July that saved the crop from serious deterioration. The current month has been an exceptionally favorable month for the cotton crop in all sections of the belt, rains and lower temperatures having been the rule in all districts of the South, and, as a result, the present outlook is for a very large crop, perhaps a bumper yield by a big margin. In the meantime the market has experienced an important decline in the value of spot cotton and in cotton for future delivery, also for manufactured goods, and as the season for new cotton will be an unusually early one, it is thought that lower levels are to be witnessed.

Any further decline of importance, however, will be more than made up by the increase in the yield, especially in the Southwest, where poor crops have been made the past two years. Large cotton crops bring more prosperity to the South, to the entire country and to the world at large than do crop failures and high prices, for while it is true that certain sections, favored with good crops, derive the benefits of high prices in a year when drouth cuts the crop short in the Southwest, as was the case last year and the year before last, farmers in the drouth sections suffer severely by failure of their crops, and the merchant in turn shares the same fate of the planter by inability to make collections. This was clearly demonstrated by conditions in West Texas, where many families had to migrate to other sections.

But the losses to trade from a small crop are many, almost too numerous to mention. When a crop falls short some 2,000,000 or 3,000,000 bales of the world's requirements, the ginner feels the loss, drayman likewise, railroads and river steamers also, as do the Atlantic liners and the various carrying concerns of all Europe, not to mention insurance interests, warehouse people, brokers, etc. But the South has by far the greater interest in the making of a large crop than any other section of the world. To-day the South is consuming 50 per cent of the cotton consumed in the United States, and consumes nearly all of the cotton seed by the making of oil and kindred products by its countless mills located in all sections of the Southern states. Therefore, if the cotton is not to be had in the quantity needed to keep the cotton mills of the United States, North and South, supplied with the raw material, and the oil mills of the South supplied with seed, drastic curtailment is usually the result, causing thousands and thousands of people to be thrown out of employment. These conditions are usually taken advantage of by money interests, and in the manipulations in the markets that result, the people have to bear the burden, owing to abnormally high prices for cotton goods.

Cotton cloths of American manufacture show a marked revival in the March, 1911 exports, the total sales thereof to China in that month being 7,857,952 yards, compared with but 64,939 yards in March of the preceding year. The 9 months figures are 47⅓ million yards, against 59½ million in the like period of 1910, 83⅓ million in the like period of 1909, and 406 million in the corresponding period of 1906, the year of high record exports of American cotton cloths to China.

THE KNIT GOODS MARKET.

The knit goods situation for the past month has been slowly improving, but despite that fact the general total of business done is still below the average for this season of the year. Early in the month road salesmen who had been out with spring lines of cotton underwear reported that buyers expected to come to the convention on July 10th to 12th and would probably be in a position to give orders at that time. Orders on agents' books for the coming spring season at this period of the month were not up to normal and most of the road salesmen admit that so far as orders are concerned, their initial road trips have not been successful. Agents handling cheap lines of union suits claimed that they have secured a fair amount of initial orders, but outside of this there has been very little accomplished.

During this period of the month hosiery lines moved slow in the cotton goods division of the market. In some cases it was claimed that a moderate amount of business has been brought through on lisle goods, but outside of this there was little of an encouraging nature to report on spring lines. On silk hosiery for spring, the situation was entirely different. Some mills were sold ahead to next January and buyers are finding it more and more difficult to secure goods for anything like early delivery. Manufacturers of cotton hosiery who started into making silk goods are reported to be doing a tremendously good business. The amount of business done in balbriggans in the early part of the month was said to be very encouraging, and this was probably because, contrary to some expectations, prices were opened on the same level as last year.

The convention of the Jobbers Association of Knit Goods Buyers, which is a subsidiary body of the National Wholesale Dry Goods Association, brought quite a number of underwear and hosiery buyers to New York, but the orders given were mostly tentative ones and were for small lots. One of the features at this period was a cut of 2½ cents in hosiery by one of the Southern knitting mills, but the prices of Northern and Eastern mills and of other Southern competitors were held steady. Considerable in the way of sampling was done, but they did not seem inclined to order freely.

Conditions in the hosiery market during the middle of the month showed quite an improvement and the demand for silk goods for men's wear to retail at 25 cents and 50 cents a pair continued to be the feature of the market. Balbriggans continued to sell well, although the decline in cotton had a tendency to depress the market along these lines. It has, in fact, had a double effect on the underwear and hosiery trade inasmuch as it has led the manufacturer to reduce opening prices on next spring's goods and has furnished the buyer an excellent reason to delay purchases. There seems to be a considerable amount of soreness among the different knit goods representatives because of the ineffectual attempt to hold back prices on new goods until the agreed upon date of July 10th, each knit goods representative being rather inclined to accuse their competitors of trying to get into the market by means of this subterfuge. Regardless of whoever may have been the first to break the agreement, the fact stands forth that samples were exhibited and prices quoted before the agreed upon time by a number of different concerns.

The styles in hosiery continued to run in blacks and tans and sheer goods are if anything becoming still more therefor. That these goods do not wear well is a self-evident fact and it is definitely stated by many that the retailers and others in a position to lead sales, are pushing this class of goods and recommending the purchase of same for the simple reason that by so doing they are enabled to turn over a greater amount of stock each year than they could otherwise do.

The month closed with a fair buying of hosiery in well-known numbers. The demand seemed to be for staple hosiery in solid colors with silks very far in the lead. Manufacturers of silk hosiery report business as far as volume is concerned as satisfactory. The demand for immediate delivery is greater than the supply. The demand for fancy silk goods, however, has not as yet developed to any sizable dimensions. The break in balbriggans has become general and is largely caused by the fact that many prices were made based on a probably lower price of cotton, which the recent decline of cotton accentuated. Reorders were moderate. There is some difference in opinion as to the sweater situation, but most people agree that the sweater market will again be in evidence.

THE YARN MARKET.

The month opened very quiet in all classes of yarns. Prices on the finer counts of yarns remained firm, while there was some price cutting among the coarser numbers. Considerable curtailment among Southern mills began with the holidays and continued for varying periods, according to the individual conditions of each mill. Mills that were very short of cotton in many cases closed down with the avowed intention to remain closed until the new crop comes into the market. As the crop in many sections of the South is well advanced, the season will probably open moderately early this year. It was reported that some mills had expressed a willingness to base prices on a probable reduction in raw cotton, but these rumors could not be verified. Knitters frequently came into the market and reported that they had various low offers made to them for forward delivery, but very few definite statements of business transacted have been shown.

When business was resumed after the holiday week, no accumulations of orders were found, although in some cases inquiries were received and a few offers. The knitters failed to show any interest in yarn prices and the whole series of conditions might be characterized at this period as a waiting market. Some few inquiries came in from knitters for fall delivery and a little business was reported put through for 20¾ and 21 cents on the basis of 10's. A great majority of the weavers are buying from hand to mouth and many of them do not have sufficient business in sight to warrent them buying very much until later in the season. In the Boston market, in general the prices were a little easier than they had been for the previous two weeks, but as a rule Eastern prices held steady. It was reported that towel manufacturers are busier and showing more interest in yarns, which was about the only optimistic feature of this period of the month.

This flat condition of the market continued practically through the entire month, although there were at times a considerable number of inquiries coming into the Philadelphia market. These inquiries, however, did not develop into orders and the only feature that stood out in relation

to the flat condition of the rest of the markets was the sale of 200,000 pounds of duck yarns made by C. J. Webb & Co., of Philadelphia, for shipment to the Argentine beginning in September and currently reported to continue to December. The price received on this lot is not definitely known but is reported as being on the basis of about 20 to 20¼ cents for 10's, which is considered exceedingly low by many spinners, being based on approximately 11-cent cotton.

The unfortunate factor of the congressional revision of the cotton schedule at this time is another and violently bearish factor in the yarn market. As long as these unsettled conditions are paramount, it is doubtful if even the lower price cotton brought about by a bumpur crop would stimulate business into anything like its normal degree of activity.

The following are the New York quotations for the end of the month:

SOUTHERN SINGLE SKEINS.

4s to 8s	20½ @21	20s	23 @--
10s to 12s	21 @21½	22s	23 @--
14s	21½ @--	26s	24 @--
16s	22½ @--	30s	25 @--

SOUTHERN TWO-PLY SKEINS.

4s to 8s	20 @21½	36s	29 @--
10s to 12s	22 @--	40s	30 @31
14s	22 @--	50s	35 @--
16s	22½ @--	60s	43 @44
20s	23 @--	3-ply and uphol-	
24s	24 @--	stered	22 @--
26s	24½ @--	4-ply and uphol-	
30s	25 @--	stered	22 @--

SOUTHERN SINGLE CHAIN WARPS.

10s to 12s	21½ @--	24s	23½ @--
14s	22 @--	26s	24 @--
16s	22½ @--	30s	25 @--
20s	22½ @--	40s	30 @--
22s	23 @23½		

SOUTHERN TWO-PLY CHAIN WARPS.

8s to 10s	21 @--	26s	24½ @--
12s to 14s	22 @--	30s	25 @--
16s	23 @--	40s	31 @--
20s	23½ @--	50s	36 @--

SOUTHERN PEELER FRAME CONES.

8s	21 @--	18s	22½ @--
10s	21¼ @--	20s	22¾ @--
11s	21½ @--	22s	23 @--
12s	21¾ @--	24s	23¼ @--
14s	22 @--	26s	23½ @--
16s	22¼ @--	30s	24 @--

THE RACE FOR REPORTS.

The great importance attached to the securing of Government statistics or Government reports is shown most interestingly by an article in the New York *World* which fully sets forth the importance usually attached to the race at the capital for such news between newspaper men and brokerage firms.

The article shows that probably the most serious and novel races run in America during the year are those in which the entrants are the representatives of the big brokerage houses and newspapers of the country who vie with each other to flash to their respective offices or to Wall street the report of the Department of Agriculture on the cotton crop.

Minutes before the noon hour, the time generally set for the making public of the important information, every telephone receiver is removed from its hook in every office in the department building. Every representative present gathers at the table and anxiously awaits the laying thereon of the statistics. At 11:45 o'clock the corridors are cleared of chairs; all employes are advised to keep in their respective offices and not get in the way.

The time intervening between that time and the noon hour seems never ending. Every representative of both the newspapers and the brokerage houses is primed for the start. Some of the older ones, realizing that age has cut several seconds from their fleet-footedness, nervously watch the clock.

At 11:50 an official of the department arrives on the scene. He acts as the judge and starter of the race. Every man entered is requested to stand at a certain place at the table so that his start to the telephone may not conflict with the start of some other entrant.

For in former days the heavier and younger racers would knock their less burly opponents aside, and would ofttimes beat them by several seconds to the 'phone. Careful to see that no entrant is "beaten" on the news, the officials of the department try to arrange the race as handicappers do horses for the races. Portly ones are designated to telephones nearest the table, while the "yearlings" and "two-year-olds"—in newspaper parlance the "cubs"—are ordered to use the wires at the further ends of the corridors.

At 11:58 the papers containing the valuable data are laid on the table in the middle of the building. Like a bunch of runners waiting for the pistol shot, the crowd stands, with hands on their respective copies of the cotton report, facing the direction in which they will have to make for the telephone. At a given signal from a telephone operator in the other end of the building the official starter comes down with a large gavel upon the table, and away they all flash.

Then there is a gibbering and a shouting over phones to the men in the offices on the other end of the wires. In five minutes the news of the department's findings is in every section of the United States; it is already on its way to Canada and to other countries interested, and within an hour it is printed and on sale in the form of commercial papers in New York, Chicago and other commercial cities of the country.

Probably more newspaper men and brokers' representatives have got "in bad" with their out-of-town offices because of a tardiness in their footsteps in sending the cotton report than over any other bit of news wired out from the national capital. Then again, advance "leaks" of the report have caused the loss of good positions under the Government and prosecution of several offenders who have made considerable money by giving out the news a day or so ahead of time, thus allowing those favored with the information to play the market successfully.

Clarence Hutton, of the *Textile World Record* staff and editor of a number of Lord & Nagle Company's publications, has taken a position with the Tariff Board until September 15th. Mr. Hutton is a graduate and former instructor of the Lowell Textile School and has filled responsible positions in a number of woolen and worsted mills. He is exceptionally well equipped for the work of the Tariff Board.

COTTON MANUFACTURING.

FILLING PILE WEAVING AND DESIGNING.

(*Contributed Exclusively to* Cotton)

BY PROF. WM. WATSON.

PART II.

CHANGING THE DENSITY OF THE PILE.

There are different ways of changing the density of the pile, and in the same design and set, alterations are frequently made simply by varying the number of picks per inch, on the thickness of the weft. In another method the design is changed in order to obtain a different proportion of pile to ground picks. This is illustrated in Fig. 5 where the design K has the same base weave as B in Fig. 3, but there are six pile picks, instead of three, to each ground pick. L and M are similar to C in Fig. 3 except that they have six and five pile picks respectively instead of four to each ground pick. In the same manner the designs N and O correspond with D but have respectively five and three pile picks to each ground pick; while the design P is similar to E except that there are four instead of five pile picks to each ground pick.

The pile is most evenly distributed when, between each pair of ground picks, every binding end holds the same same number of tuft, as shown at K in Fig. 5. When the modified arrangement makes it necessary for the pile weave to be extended over two or more repeat of the ground weave, a sateen base is better for the pile interlacing than a twill base. The reason for this will be understood from a comparison of the plans M and N, both of which are arranged on a 4-thread base with five pile to one ground pick. Between each pair of pile picks two tufts occur on one end in the positions where the dots connect the full squares. In the plan M on account of the pile interlacing being based on a twill weave, these positions run in twill order, which may result in a slight twilled effect appearing in the finished cloth. In N, however, the positions occur in sateen order because a sateen pile base weave is employed and the liability of twill lines being formed is avoided. Also, in the designs O and P, between each pair of ground picks, there is one end on which there are no tufts, and if these positions were to run in twill order there would be a similar liability of twill lines being formed in the cloth. This may be avoided by using a sateen base for the pile interlacing, as shown in the two examples.

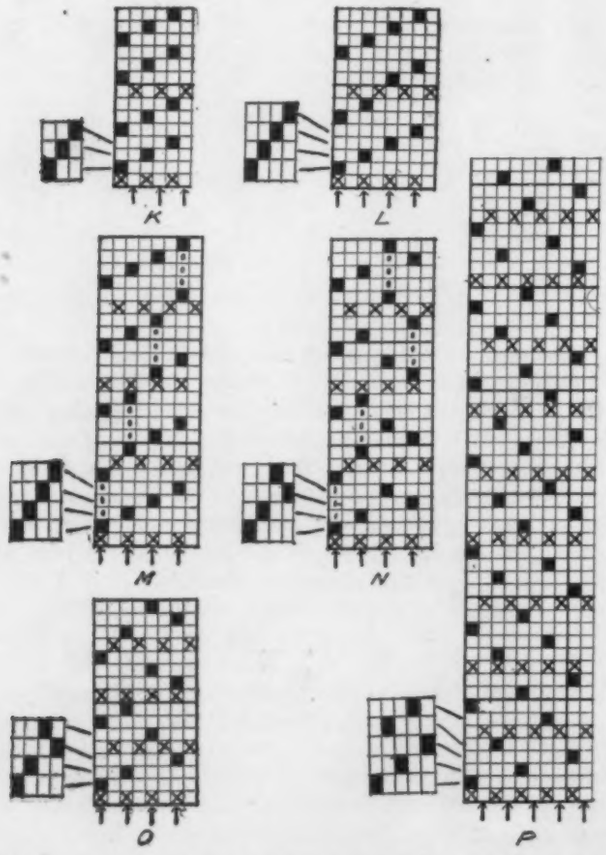


Fig. 5. A Method of Changing the Design in Order to Obtain Different Proportions of Pile.

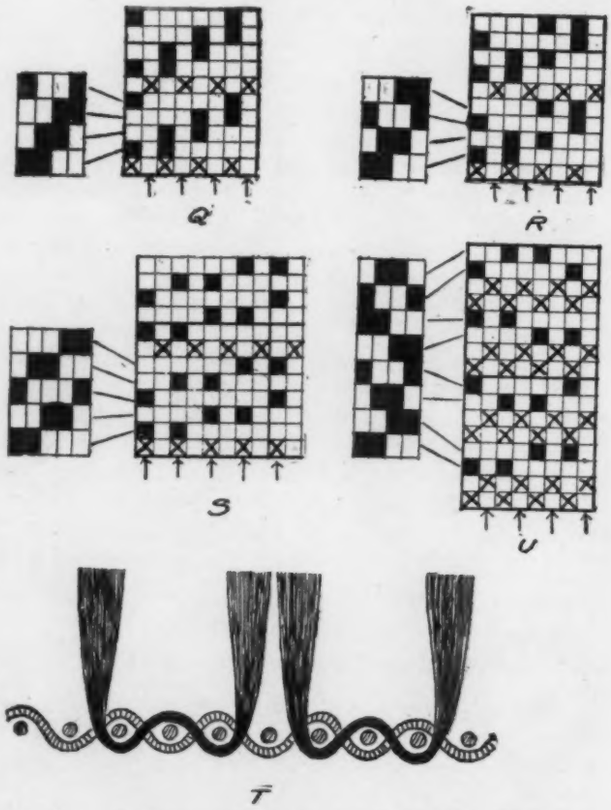


Fig. 6. Method of Binding the Pile More Firmly.

In changing the proportion of pile picks to ground picks in a design the effect of the alteration should be considered in relation to the number of picks that it is proposed to insert under the new conditions. The alteration may be for the purpose of changing the density while retaining exactly the same total number of picks per inch as the original structure; or of changing the density while retaining a similar ground structure; or the idea may be to obtain exactly the same density as before, but with a differ-

ent ground structure. The following list shows the result which will occur under the different conditions named, assuming that the weave D in Fig. 3-which has four pile picks to one ground pick,—is changed to five and three pile picks respectively to each ground pick, as shown at N and O in Fig. 5. The total picks are taken as 400 per inch, giving 80 ground and 320 pile picks per inch; and the tufts per square inch are based on the cloth having 72 ends per inch.

	Design.	Ratio of pile picks to ground picks.	Ground picks per inch.	Pile picks per inch.	Total picks per inch.	Tufts per square inch.	Remarks.
Original structure.	D	4 to 1	80	320	400	2880	Original structure.
To retain same total picks as original structure	N	5 to 1	66	334	400	3906	Density of pile increased. Ground texture less firm.
	O	3 to 1	100	300	400	2700	Density of pile reduced. Ground texture firmer.
To retain same density of pile as original struc're	N	5 to 1	64	320	384	2880	Total picks reduced. Ground texture less firm.
	O	3 to 1	106	320	426	2880	Total picks increased. Ground texture firmer.
To retain same ground texture as original structure	N	5 to 1	80	400	480	3600	Density of pile increased. Total picks increased.
	O	3 to 1	80	240	320	2160	Density of pile reduced. Total picks reduced.

FASTNESS OF THE PILE.

A very important feature in these fabrics is the proper securing of the pile to the foundation cloth so that there will be no liability of the tufts fraying out. In the examples given in Figs. 3, 4 and 5, the tufts are bound in by one end only at a place, and the fastness of the pile is chiefly dependant upon the pressure of the picks upon one another. It is therefore necessary, particularly in the longer piles, for a very large number of picks to be inserted in order to keep the pile firm. If it is desired to introduce fewer picks per inch, or to make a very long pile, the necessary firmness may be obtained by interweaving the pile picks more frequently, making what is termed a "fast" or "lashed" pile. The example Q, R and S, given in Fig. 6, respectively show how the plans C, D and E in Fig. 3 may be made firmer. The section, shown at T, illustrates how the tufts, formed by the picks five and six of the design S, are bound in. By comparing the designs given in Figs. 3 and 6 it will be seen that with the same ends per inch Q and R will each produce the same length of pile as B and S, as C or D. The firmer interweaving renders it more difficult to insert a large amount of filling, and it is generally recognized that in a fast pile the richness of the cloth will suffer, but there is the advantage that the greater firmness gives the cloth better wearing qualities.

A plan for a very thin pile structure is given at U in Fig. 6, in which the arrangement is two plain ground picks to two "fast" pile picks. The idea in this case is for the pile to be developed,—say in black filling,—upon a colored foundation of a tartan character, which will show through the thin pile covering. The presence of the pile tends to make the foundation colors appear deeper and richer.

Examples of plain velveteens with a twill foundation are given in Fig. 7, A, B and C having a one-and-two twill on "Genoa" back, while the ground weave of D and E is two-and-two twill. A twill foundation weave is looser than a plain, and therefore not only permits, but, in order to maintain the same firmness of pile, requires a large number of ground picks to be inserted. Hence, with the same ratio of pile to ground picks, more pile picks can be put in and a denser pile formed. Also, a cloth with a twill ground is softer and more flexible than a similar cloth with plain ground; the latter ground, when very heavily filled, tending to make the cloth handle somewhat hard and stiff.

In A, B and C in Fig. 7, the pile weave is based on one-and-two twill which, as before, is marked on alternate ends; the pile picks are arranged in the proportion respectively of two, three and four to each ground pick. The one-and-two twill foundation weave of these designs is invariably made with the filling float on the underside of the cloth. This provides a better surface than a warp twill back for binding in the pile picks and covering them on the underside. Also the two-and-one filling surface is suitable for the application of a raised or flannelette finish to the back if such is required.

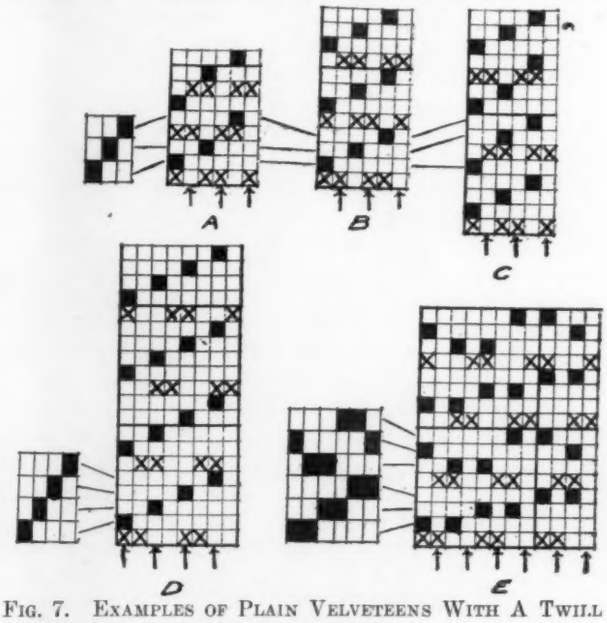


FIG. 7. EXAMPLES OF PLAIN VELVETEENS WITH A TWILL FOUNDATION.

It may be noted that A in Fig. 7 is the standard design for the moleskin class of fabric, which is usually made in coarse cotton yarns. This is not a pile fabric as the floating picks are not cut but remain in the condition they are after weaving. The cloth is very strong and leathery, and is eminently suitable for workmen's clothing which is subjected to very hard wear.

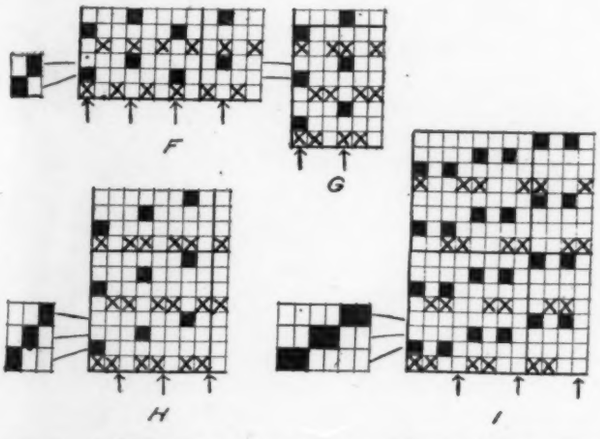


FIG. 8. A METHOD OF ARRANGING THE PILE INTERLACING TO REDUCE THE TIME OF PILE CUTTING.

A two-and-two twill foundation weave enables a very large number of ground picks to be readily inserted, and is therefore used for the heaviest and densest velveteens. In the design D, Fig. 7, the pile weave is based on one-and-three twill and there are four pile picks to each ground pick, while in E six-thread sateen pile base weave is employed with the pile made fast, and there are three pile picks to each ground pick.

The designs, given in Fig. 8, illustrate a method of arranging the pile interlacing that is sometimes employed with the object of reducing the time occupied in the pile cutting. In F, G and H, the pile base weaves are indicated only on every third end, therefore only one-third as many longitudinal traverses of the cutting knife are required, as there are ends in the width of the cloth to be cut over. Compared with the examples in which the binding of the pile picks occurs on alternate ends, the number of cutting races is reduced by one-third. The distribution of the pile however, is not so perfect, and the surface of the cloth has a coarse appearance. I in Fig. 8 shows a fast pile effect in which the pile interlacing is based on a one-and-two twill weave doubled; and as indicated by the arrows below the design, the cutting races occur only on every fourth end.

(To be Continued.)

SHEDDING MOTIONS IN WEAVING.

(Contributed Exclusively to COTTON*)*

BY F. W. HORROCKS.

In the weaving of plain cloths, the best results as regards both amount and quality of production can only be attained when all the various details of the loom are so constructed and arranged as to reduce strain and friction of the yarn to a minimum. Formerly, very little regard was paid to the yarn, the loom being considered to have done its duty if it made a shed and picked the shuttle across. Modern competition has, however, caused the manufacturer to look about for the loom that will perform these and other motions in the best and most economical manner possible. The object of shedding in the plain loom is simply to separate the ends of the warp so as to permit the shuttle containing the weft to pass through them, alternate ends being raised for one pick, and depressed for the next pick. The means used consist of a tappet of two leaves placed on the lower shaft of the loom; a pair of treadles operated by these tappets; two or four healds attached to these treadles; and a roller over the healds to which the upper staves of the healds are secured.

Formerly, the tappet leaves were quite round in shape, this being a very faulty plan as it did not give sufficient dwell or pause for the shuttle to get across easily. In order to give the required dwell, the tackler or fixer would arrange for a space between the tappet leaves and the treadle bowls when the healds were level, but this gave a very jerky motion to the healds during the shedding, besides making a little shed. When tappets are properly shaped, the treadle bowls should be in constant contact with them, so as to give the proper length of dwell to the healds; then the healds should move slowly at first, increasing in speed to the center of the shed, then decreasing in speed till the opposite dwell is reached. The particular motion required is given only by the tappet, the height of the shed being obtained from the combined effect of the lift of the tappet and the leverage of the treadles.

The amount of dwell to be given to the healds depends upon the width of the loom and varies from one-third to two-thirds of the revolution of the crank shaft, though a dwell of one-half a revolution is most common. In the case of plain cloth weaving, in which the cloth is required to be well covered, a long dwell gives the best results, as the ends of the slack top shed spread themselves out better and make the cloth appear full. It must not be forgotten however, that the longer the dwell of the healds, and the shorter is the time for the traverse of the healds, so that a quick change or traverse is apt to give a jerky motion to the healds.

Some looms have the stud or fulcrum of the treadles at the front of the loom, whilst in other cases it is behind the loom. When the fulcrum is at the front of the loom larger tappets are required than when the fulcrum is at the back, to give the same size of shed. In most cases the back heald or pair of healds is required to be raised higher and depressed lower than the front heald or pair. This difference in the shedding is to make all the ends be the same height before the reed, though in this case there is the disadvantage of the ends of the back healds receiving more strain than those of the front healds. This can to some extent be compensated for by the method in which the dividing or lease rods are put in the yarn behind the healds. When four healds are used (in couples), the proper method of arranging the lease rods is—First, raise the second and fourth healds and insert a thick rod; then raise the first and third healds and insert a thin rod. By this method the strain upon the ends is equalized as much as possible.

In order to produce a well covered cloth, and one that will be free from reed marks, it is necessary to have the top shed comparatively slack, so that the ends will spread themselves out. This difference in the tension of the two sheds is brought about by setting the healds low in the loom, or by raising the back rest. This method throws considerable strain upon the bottom shed, but a slack top shed is necessary to ensure a good appearance of the cloth. A low grade plain cloth may be woven with both sheds of equal tension, that is, with the warp line perfectly straight when the healds are level, but this cloth is apt to show the ends running in twos.

Most plain looms are arranged with vibrating back rests, so adjusted as to give way a little when the shed is opening. This keeps the yarn at an even tension, and reduces the friction and strain to a minimum. Formerly, it was considered necessary to have ropes round the ruffles of the beams, but now chains are more generally preferred, used in conjunction with the vibrating back rest. Positive let-off motions have, so far, not been extensively adopted in Lancashire, though in some of the more up-to-date mills they are being tried. The coarser qualities of cloth can be, and are, woven by means of two healds, as in the case of cotton blanketings, etc., but the great bulk of plain goods require four healds, which are coupled. What are known as plain velvets are two ends to one pick, the weft being soft and preponderating over the yarn. The ends in these plain velvets are drawn in two in each eye.

A business house in Italy informs an American consul that it desires to communicate with American manufacturers of machinery adapted for cleaning cotton. For further information apply to Bureau of Manufactures, Washington, D. C., and refer to File No. 7026.

COTTON MILL MACHINERY CALCULATIONS.

(Contributed Exclusively to COTTON*)*

BY B. M. PARKER.

PART VI.

THE COMBING PROCESS.

In the manufacture of the finer grades of cotton yarns intended for the hosiery and underwear trade, for the better grades of cotton dress goods, for mercerizing, for crochet and embroidery cottons, and for the manufacture of lace and sewing thread, the cotton is passed through another process of cleaning after the carding, known as combing. This is intended for use only in those mills that are making a class of product that is desired to be exceptionally smooth and clean, and on the coarser grades of work it is entirely too expensive and not necessary to use.

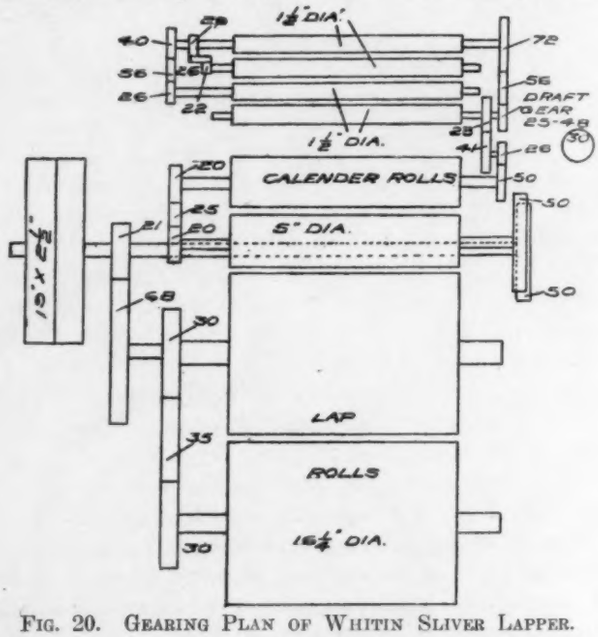


FIG. 20. GEARING PLAN OF WHITIN SLIVER LAPPER.

Only where the cost of production is secondary to the quality of the finished product is it possible to use the combing process to advantage.

There are usually three machines used in combing, the sliver lapper, the ribbon lapper, and the comber. The first two are simply preparatory machines and are used for the purpose of getting the fibers in a parallel condition and putting the material in a suitable shape for use on the comber, while the last does the real work of cleaning.

THE SLIVER LAPPER.

The object of the sliver lapper is to take from 12 to 20 card slivers, give them a draft of from 1.5 to 3.5 and combine them into a smooth, even sheet, or lap, and wind this lap upon a wooden spool for use on the ribbon lapper. The drawing bringing the fiber into parallelism.

Stop-motions are provided which operate to stop the frame when one breaks or runs out at the back, and also when the lap reaches a certain size, thus preventing singles at the back and making all laps approximately the same length.

The drawing is accomplished by means of three or four pairs of drawing rolls arranged for common or metallic rolls and, in operation and care, similar to those in use on drawing frames. In fact both the sliver and ribbon lappers can be considered as modified drawing frames. Fig. 20 shows a diagram of the gearing of the sliver lapper built by the Whitin Machine Works, geared for use with leather rolls. This machine has four pairs of drawing rolls, which distributes the total draft more widely than would be the case with three rolls.

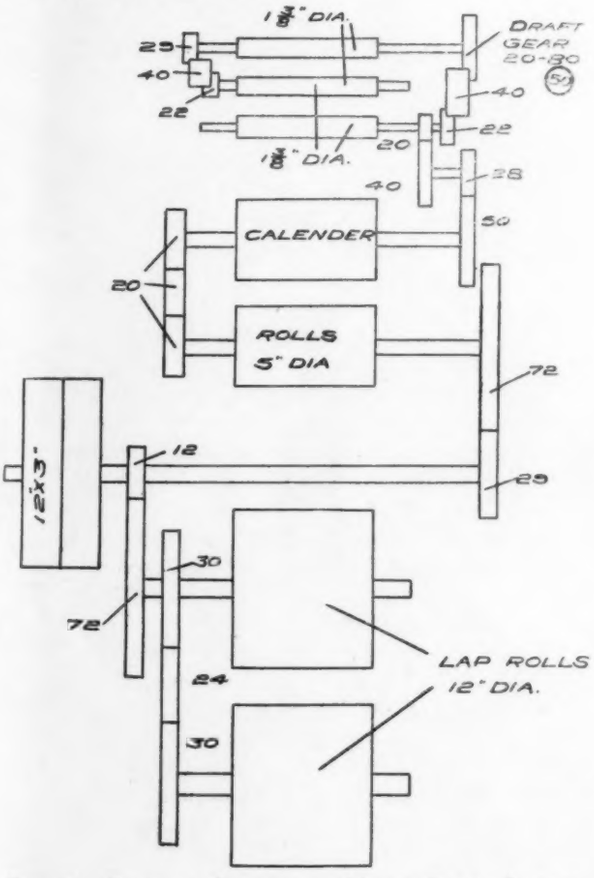


FIG. 21. PLAN OF GEARING ON MASON SLIVER LAPPER.

With a 30-tooth draft gear and figuring the draft between the 16¼-inch lap roll and the 1½-inch back drawing roll we get 2.342 for the total draft of the machine, as follows:

$$\frac{16.25 \times 21 \times 50 \times 20 \times 26 \times 23 \times 72}{68 \times 50 \times 20 \times 50 \times 41 \times 30 \times 1.5} =$$

2.342 total draft.

Using the above formula, but leaving out the 30-tooth draft gear, we get the draft factor, as follows:

$$\frac{16.25 \times 21 \times 50 \times 20 \times 26 \times 23 \times 72}{68 \times 50 \times 20 \times 50 \times 41 \times 30 \times 1.5} =$$

70.267 draft factor.

Factor ÷ gear = draft. Then 70.267 ÷ 30 = 2.342 draft. The above total draft is distributed or divided into five intermediate drafts, as follows: (1) Draft between back and third drawing rolls; (2) draft between third and second drawing rolls; (3) draft between second and front drawing rolls; (4) draft between front drawing roll and the calender rolls; and (5) draft between the calender rolls and the lap rolls.

The first three of the above intermediate drafts are the ones that perform the real reduction in the bulk or weight of the material, while the last two serve simply to keep the material tight and in no case should be enough to stretch the lap. The break draft, or the one that is altered when a change is made in the total draft, is between the front and second drawing rolls, the other drafts remaining the same regardless of any change made in the total draft.

Fig. 21 shows a diagram of the gearing of the sliver lapper built by the Mason Machine Works. This machine is built on the same principles as and similar to the one shown in Fig. 20, but has three drawing rolls. Using a 50-tooth draft change gear on the back roll, the following gives the draft:

$$\frac{12 \times 12 \times 72 \times 20 \times 28 \times 20 \times 50}{72 \times 29 \times 20 \times 50 \times 40 \times 22 \times 1.375} = 2.28 \text{ draft.}$$

By leaving out the 50-tooth draft gear in the above formula, we get the draft factor as follows:

$$\frac{12 \times 12 \times 72 \times 20 \times 28 \times 20 \times X}{72 \times 29 \times 20 \times 50 \times 40 \times 22 \times 1.375} =$$

.0496 draft factor.

In any arrangement of this kind, where the draft gear is a driven gear, it will come above the line in the formula for draft and must be treated in a different manner from the one just worked out. In this case the rules for using the draft factor will be:

Factor $\times$ *gear* = *draft.* *Draft* $\div$ *factor* = *gear.*

Example. Draft factor of .0496, what draft will a 50-tooth draft gear give: $.0496 \times 50 = 2.28$ draft.

PRODUCTION.

On either of the above machines the production varies greatly, depending upon the speed at which they are run and the weight of the lap produced. The laps vary in weight from 250 to 450 grains per yard, and the 5-inch calender rolls vary in speed from 60 to 120 revolutions per minute, which would give a front drawing roll speed of 200 to 450 revolutions per minute. This would make the production vary from 500 to 1,500 pounds per day of 10 hours, allowing for a 25 per cent. loss of time due to stoppages, etc. Basing the production on the speed of the calendar rolls, the method of figuring would be as follows:

Example. What would be the production of a sliver lapper, if the calendar rolls were making 100 revolutions per minute, the lap weighing 350 grains per yard and allowing for 25 per cent. loss of time, in a 10-hour day?

$$\frac{5 \times 3.1416 \times 100 \times 600 \times 350 \times .75}{36 \times 7000} = 981.75 \text{ pounds.}$$

In determining the speed of the driving pulleys on the machines we must take into consideration the ratio in speed between the calender rolls and the driving shaft. On the Whitin frame, geared as shown in Fig. 20, one revolution of driving pulleys gives one revolution to calender rolls, so the speed of the two will be the same. On the Mason frame, as shown in Fig. 21, it takes 2.48 revolutions of driving pulley to give the calender rolls one revolution, so that the speed of the driving pulleys will equal the speed of the calender rolls multiplied by 2.48. With this in view the following calculations for getting the size of the pulleys needed to run the machines will be understood.

Example. If the main line shafting has a speed of 325 revolutions per minute, what size pulley is needed to drive the calender rolls of a Whitin sliver lapper at 100 revolutions per minute, the driving pulley on the machine being 19 inches in diameter?

$$\frac{100 \times 19}{325} = 5.85 \text{ inches, or about a 6-inch pulley is needed.}$$

Example. Find the size of pulley to drive the calender rolls on a Mason machine at 100 revolutions per minute? In this case we must multiply the speed of the calender rolls by 2.48 to get the speed of the driving pulleys.

$$\frac{2.48 \times 100 \times 12}{325} = 9.15 \text{ inches, or about a 9.25-inch pulley.}$$

(To be Continued.)

91st MEETING OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

The Board of Governors of the National Association of Cotton Manufacturers have decided to hold the 91st meeting of that organization at the Hotel Equinox, Manchester, Vt., beginning on the evening of September 27th and continuing for the two following days. This hotel is situated in a district of rare scenic beauty, and its golf course is claimed to be among the best in this country.

The first evening will be devoted to the president's address, by Franklin W. Hobbs, Brookline, Mass., and also an address of welcome by His Excellency John H. Mead, LL.D., Governor of Vermont, to be followed by a formal reception by the president which will afford an opportunity for the renewal of old acquaintances and the formation of new ones. Sessions for the presentation of papers will be held during the forenoons and evenings of the following days. It is expected that the Hon. James Wilson, Secretary of Agriculture, and Hon. John Wingate Weeks, member of Congress and also honorary member of the association, will address the meeting at some of its sessions. Later information will be given in regard to the program and traveling arrangements, excursion rates, etc., for the benefit of the members.

The number of cotton spindles in the world is estimated at 135,000,000, which is an increase of at least 20,000,000 spindles since 1907. During the past 10 years there has been an increase of 10,400,000 spindles in the United Kingdom, 7,500,000 spindles in continental Europe, and 1,155,000 spindles in India. The increase in the United States for the same period is estimated at about the same number as in the United Kingdom. The annual potential consuming capacity of the world's spindles, if running on full time, is placed at 22,500,000 bales of 500 pounds.

During the 10 months ending with January, 1911, the mills of India produced 517,983,956 pounds of cotton yarn and 898,769,465 yards of cotton woven goods, as against 526,077,246 pounds of yarn and 823,732,069 yards of woven goods for the same period in 1909-10 and 547,055,045 pounds of yarn and 695,184,767 yards of woven goods in 1908-9.

KNITTING

THE RIB TOP MACHINE.

SETTING THE CAMS AND YARN CARRIER.—CAUSES FOR BENT AND BROKEN NEEDLES.—ROUGH STITCHES.—STREAKED WORK.—BIRDS EYES.

(*Contributed Exclusively to* COTTON)

BY H. K.

This machine as its name implies, is especially designed for the making of ribbed tops. It is automatic in all its movements, and may have one or two feeds, the common type of machine having but one feed. According to the setting of the pattern mechanism, almost any desired length of top can be made, either very elastic or non-elastic, having any desired number of welts, usually three in number, but which can be increased or decreased when necessary. An extra course of long loops are made at a short distance from the end of the top, this is for convenience in transferring the top to the needles of the stocking machine.

The ribs may be cut by a rib cutter or by hand. The

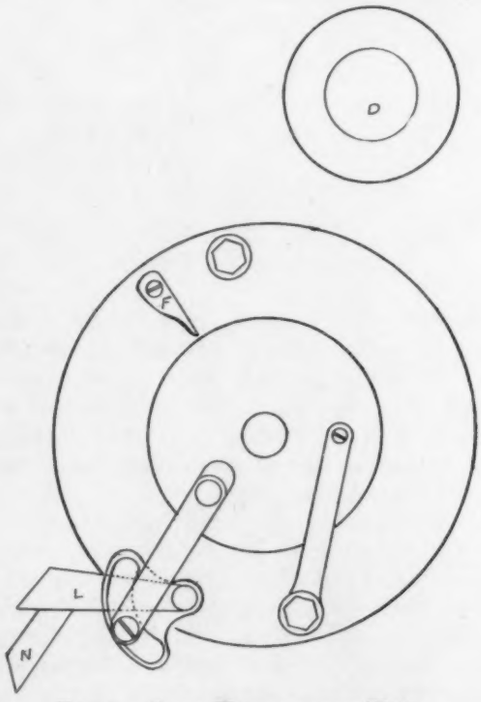


FIG. 1. PLAN VIEW OF THE HEAD.

tops are cut between the slack course and the welts. This gives us the rib proper. The top may now be transferred to the points of the transfer quill, or direct to the needles of the footing machine. In case of the former, which is in most general use, the rib is then transferred to the footing machine by placing the hollow points of the transfer over the hooks of the needles, allowing the loops to be transferred from the points of the quill to the needles.

The rib top machine is a stationary cylinder machine, the needle cylinder, needle dial, take-up, and fabric are stationary. The cam ring to which are fixed the cylinder cams and the dial cams which actuate the dial needles fixed in the dial, revolve. Because of its small diameter this type of machine has usually only one feed and one set of cams for cylinder and dial. The dial is provided with a cam which can be changed to allow the dial needles to tuck at the formation of the welts.

A welt usually consists of 5 courses. The first course is made with the dial needles tucking the stitch, that is the needles only come out far enough to take the new loop without allowing the old loop to be cast off the needle. For the second and third courses, the cylinder needles only knit, the dial needles still retain their loops. Fourth and fifth

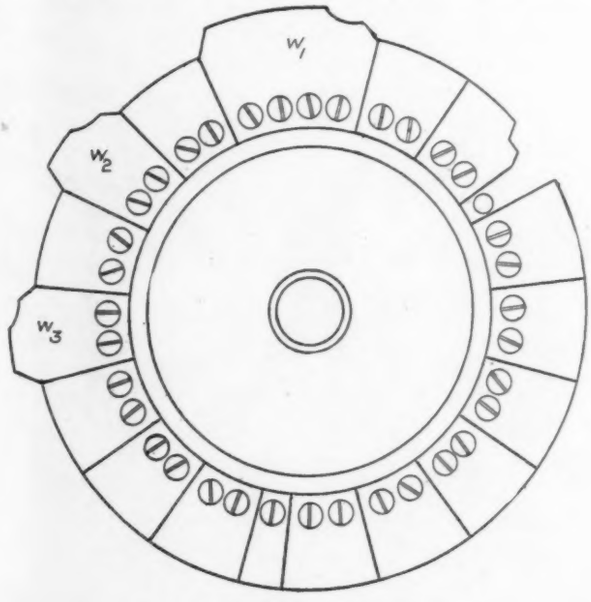


FIG. 2. THE WELT CAM DISK.

courses are made with both dial and cylinder needles knitting. This operation may be repeated according to the number of welts made. In some cases the first welt is made larger than the succeeding welts, the extra courses being knit on the cylinder needles.

The variation of needle movement is effected by means of a movable cam which is controlled by a pattern wheel arrangement. As the rib top undergoes more stretching than any other part of the stocking, it is essential that this part of the stocking should be more elastic. It must also be knitted firmly so that it will fit tightly, but on the other hand if knit too tight, it is with difficulty stretched enough to go on over the heel. To keep the fabric elastic, it is necessary that the cylinder and dial needles draw the same length of loop, otherwise the inequality between them will give a consequent lack of strength and elasticity.

A rule for setting the cams is to have the dial needle latch close behind the yarn carrier just as the cylinder needle latch has closed the hook. There may be some cases where the outline of the cams has been changed by grinding or wear, that this is not possible, but it will serve as a guide in any case. The object in view at all times is to get the needle to draw-in in time to get the thread, taking

care not to do it too quickly, as that will throw the stitches off. Have the needle draw in so that the yarn will pass along about ⅛ inch from the end of the hook.

To set the yarn carrier, have the heel back as far as it will go and not touch the cylinder needle latch when it is closing, and have the distance from the dial needle just enough to let the hooks pass under when making the welt. The forward end of the yarn should not be set too far away, as that will cause dropped stitches on the cylinder needles, and is liable to bend the latches. Bending or breaking needles in the welt is caused by the work being too tight on the cylinder needles, thereby carrying the work

FIG. 3. THE DIAL CAMS.

up under the dial needles, raising the dial needles and allowing the latches to come in contact with the front end of the drawing-in cam. It sometimes happens that there is not enough room between the dial and the front end of the drawing-in cam, in which case the cam should be ground

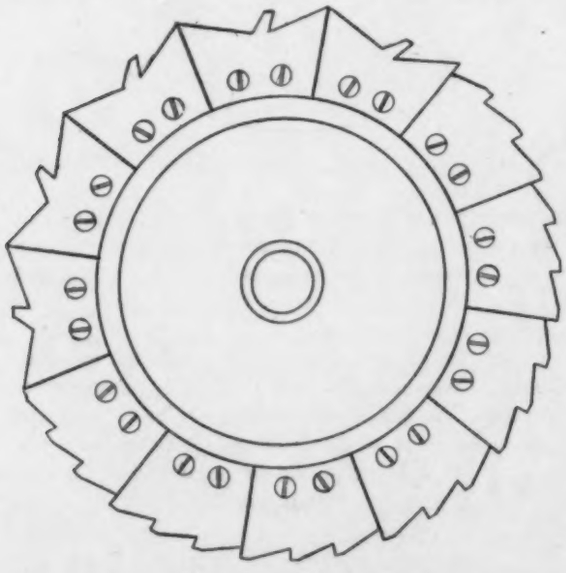


FIG. 4. ONE OF THE PATTERN DISKS.

off and polished so that when it strikes a latch it will close it instead of breaking or bending it.

If the yarn guide is smooth on the inner surface and bottom there should be no trouble from bent or broken latches unless caused by the take-up. If the take-up does not pull evenly, or hard enough, the work will rise on the needles bending them, as well as cutting holes and dropping stitches. The drawing-in cam will also cut holes if set in too far, or if not properly ground, that is if it draws in too quick. This cam should be so set as to just cast off the dial stitches. If a small hole shows in the fabric examine it for knots, if the ends of the yarn look as if cut off square, examine the latch of the needle at that place. If the ends are drawn out thin, it would naturally be caused by a thin place in the yarn.

Large holes are usually caused by poor needles having a bent latch or hook. A rough stitch along one of the ribs indicates a poor needle, a bent latch, or a loose rivet. These can be easily traced by following the rib up to the needle in the cylinder or dial. Bad needles can be removed from the cylinder or dial by turning the cam cylinder

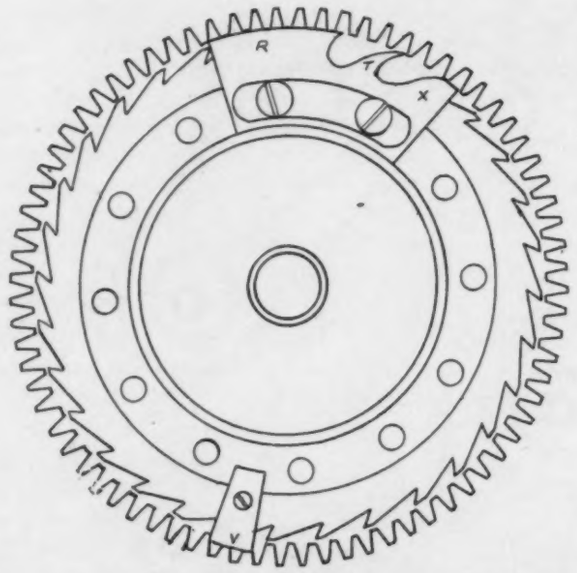


FIG. 5. DIAGRAM OF THE DISKS WHICH CONTROL THE LENGTH OF RIB TOP.

around to the opening provided for that purpose. Sometimes difficulty is experienced in getting the proper tension on the goods. A rib top should not be too tight, but very elastic and strong, and should resume its natural shape with a snap after stretching. The lack of elasticity is caused by the dial needles drawing longer loops than the cylinder needles and vice-versa.

"Birds Eyes" may be produced from several causes, prominent among which are a worn dial which causes the needles to set unevenly. Where two or more threads are used in the goods, the needles will sometimes miss one of them, forming a sort of loop or "birds eye." The same thing may be caused by bent needles. Streaked work is often caused by lack of cleaning the machines and is sometimes caused on double feed machines by the guides not being set evenly. The measuring of the goods is another important point, as it is often very difficult to produce a top of the same length from several different machines. Rib tops should be measured at least once a day in order to keep even lengths and tensions. In cutting the rib tops apart, there should be at least five or six courses between the cut and the welt to allow for the ravelling that takes place in the dyeing and finishing processes. Cutting too close causes the ravelling to run down into the welt and spoils its appearance. After finishing if any yarn remains above the welt it can be trimmed off close.

The pattern mechanism on a machine of this type is of simple construction. For the various changes in the fabrics, different movements must be given to the needles. The welts, slack course and the length of the rib top, are made according to how the pattern mechanism is arranged. In addition to this, we have a take-up motion which automatically draws down the fabric when knitted. Fig. 1 is a plan view of the head; D is a disk situated at the left and towards the back of the head of the machine. The height at which it is held operates the dial cams through the levers L and N. This disk is raised or lowered through the action of a lever bearing on the disk under the head. See Fig. 2.

Fastened to the disk are a number of cams which are known as welt cams. Should the rib top require three

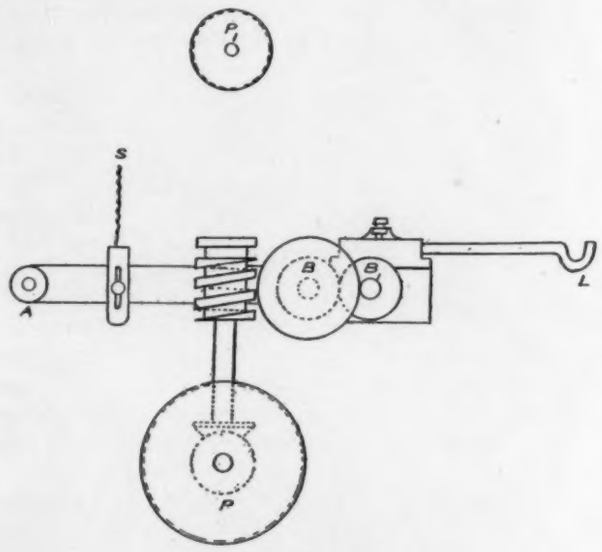


FIG. 6. THE TAKE-UP MOTION.

welts, three welt cams are necessary. W1 is the largest and gives an extra course in the first welt. When the lever is bearing on part of the cam marked T, the dial needles tuck their loops for one course. The dial cams are shown in Fig. 3. The cam marked F has three positions. In the position shown in the diagram the dial needles knit, when half-way in the dial needles tuck, and when the cam is in altogether, the dial needles have no knitting action whatever.

As already stated this cam receives its movement from levers L and N on Fig. 1. Fig. 4 is one of the pattern disks situated outside of the frame of the machine. When starting in at the top of cuff, the pawl driving this pattern disk should be engaging with the second of the blank spaces. These pawls are driven by a pawl on the revolving cam cylinder, and by means of an adjusting screw may be made to take up one or two teeth at each stroke. Fig. 5 is a diagram of the disks which control the length of the rib top. Cam R and additional cams to the left are used to lengthen the rib. Cam X and cams placed to the right of it, control the distance between the slack course and the next top. Cam T produces a single course of long loops. V is the cam used in bringing the disk, (Fig. 4), into correct position for forming the slack course. Cams fastened to the outside disk prevent pawls from turning disks. See Figs. 4 and 5.

The take-up motion, Fig. 6, on rib top machines is known as the gravity or balance take-up. All parts of the take-up are fulcrumed at A, the fabric as knitted passing down between the rollers B and B1, these rollers being geared together. The weight of the take-up pulls down on the fabric, and as it pulls down, it tightens the band on the grooved pulleys P and P1. These pulleys when driven, drive the worm gear W, which turns the rolls B and B1, thus raising the take-up and loosening the band. As the band loosens, the pulleys P and P1 stop turning. If it is desired to take up faster, weights can be suspended on lever L, the length of this lever being adjustable.

Fig. 7 shows the cylinder cams. The stitch cam A is adjustable by means of screw B. This stop screw regulates the length of loop drawn by the cylinder needles. C is the slide by means of which the stitch is automatically loosened by set screw E for producing slack course at end of cuff. D is the stud on which slackening lever turns. F is an automatic stop motion for stopping the machine when the fabric rises on the needles. G is the lever through which the dial cam is adjusted for making tuck stitches at the top of cuff.

To start off a machine with no fabric on the needles, it is necessary to pick on a piece of fabric by hand on to the cylinder needles. Having procured a piece of fabric similar in diameter to the needle cylinder, insert a needle between the dial and cylinder and with the hook of the needle, take a narrow but firm hold on the edge of the fabric which is to be placed on the needles of the cylinder.

This fabric has to be placed on the needles as evenly as

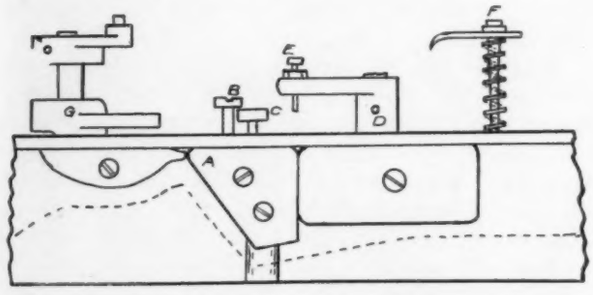


FIG. 7. THE CYLINDER CAMS.

possible, making sure that the fabric comes between the cylinder and dial dogs. We have to avoid a wide edge, as this prevents the fabric from being drawn down between the dial and cylinder. Too narrow an edge would allow the fabric to be easily pulled off the needles. About ⅛ inch from the needles to the edge of the fabric will be found sufficient in most cases. It is advisable to start the fabric at several points first and then afterwards complete the work on the remaining needles. Thread the guide and turn the machine slowly, at same time opening up all the dial latches. After making sure that machine is working properly and all bad needles removed, the machine may be oiled and started by power. The speed of the head in this type of machine is usually about 160 revolutions per minute.

Cotton is king in the exports of products of agriculture, the value exported during the year being 585 million dollars, by far the largest total ever shown in the cotton export trade, against 450 millions in 1910 and 431 millions in 1907, the former high record year.

DYEING, BLEACHING AND FINISHING.

THE APPLICATION OF WEIGHTING MATERIALS.

(*Contributed Exclusively to* COTTON)

BY H. C. W.

In the manufacture of certain classes of goods it becomes necessary to add weight to the cloth through the addition of some unfibrous substance. Such substances are known as weighting materials and are applied to the warp yarn during the sizing operation. The substances available for this purpose are few in number. They consist of the sulphates of lime, magnesia and Baryta, and another substance formed by the decomposition of feldspar and known as China clay. The sulphate of lime is commonly called Plaster-of-Paris. It is sometimes used as a filling agent in bleached cloth. Sulphate of Baryta is a very weighty material, but is harsh and hard to firmly fix on the thread.

China clay possesses the best qualities necessary and is the substance most commonly used today. It is found in southern England, China and Japan. The clay from China is the best grade found and possesses, when pure, that freedom from grit, evenness of color and smooth, oily feel that are so important in such a substance. Another important quality of China clay is its affinity for water, which it very tenaciously holds even when heated to high temperatures.

The application of weighting materials to the yarns is made during the sizing operation. A solution of China clay is made up and added to the sizing solution. It is almost impossible to lay down a list of ingredients which will add a certain percentage of weight. Certain formulas may be given, however, which will serve as a working basis.

The weight added to yarns varies from 10 per cent. to sometimes 150 per cent. The following list of formulas have all been used successfully:

To add 20 per cent. weight: Wheat flour, 70 per cent.; China clay, 20 per cent.; wax or tallow, 8 per cent.; zinc. chloride, 2 per cent.; blue, (aniline), 2 oz.

To add 50 per cent. weight: Wheat flour, 50 per cent.; China clay, 20 per cent.; wax or tallow, 8 per cent.; zinc chloride, 3 per cent.; chloride of magnesium, 3 per cent.

To add about 100 per cent. weight: Wheat flour, 23 per cent.; China clay, 44 per cent.; Sago flour, 8 per cent.; tallow, 10 per cent.; magnesium chloride, 10 per cent.; zinc chloride, 5 per cent.

The above formulas are a few of the many in use. A great deal depends upon other influences, such as the method of preparing the size, its application, the specific gravity of the mixture, the humidity, the kind of yarn and the amount of twist it contains. It follows therefore that in some cases the above formulas will work satisfactorily while in others they will serve only as a basis for experimenting.

The mixture must not only be prepared with the idea of adding weight, but must be made of such a consistency that it will thoroughly permeate, or become firmly fixed in the yarn. For hard twisted yarns the mixture must be made thinner than for slacker twisted yarns. Unless the size "soaks into" the yarn it will be rubbed off in weaving. Again a size which will become fixed in a moist, damp atmosphere will not thoroughly permeate the yarn in a dry atmosphere.

After experimenting and finding the correct proportions of each of the ingredients, the formula should never under any circumstances be changed unless the quality of the ingredients should change. The method of preparation should never be changed, and after once determining the correct mixing the specific gravity should always be kept constant. For this purpose a twaddle hydrometer should be used. By adding water the specific gravity can be brought to any point desired.

In mixing size for weighting purposes the ingredients, all except the China clay, are mixed together as usual. The China clay is mixed in a separate vat until it has been thoroughly dissolved. It has to be constantly agitated that the clay does not settle. Some sizers prefer to mix it cold, while others boil it for several hours. If the clay is not pure and contains grit, it will have to be strained before it can be mixed with the other ingredients. It is not sufficient that the mixture be simply heated, but it must be actually boiled. If it boils up or spatters, add a small amount of tallow and it will stop it.

In preparing the flour for the size mixing, some finishers prefer to let it stand or ferment. This is done to stop decomposition or mildew. It consists of mixing the flour to a liquid state and allowing it to stand 10 to 15 days. In the opinion of the writer if proper care is exercised this will not be necessary. The proper mixing of the size and adding of chloride of zinc should stop any decomposition that would set in.

An arrangement which would prove satisfactory is a combination of two vats, one placed over the other. The top vat being used to mix the China clay separately. In the bottom vat the flour and tallow are mixed. When the China clay has become thoroughly mixed it is run into the bottom vat through a screen which prevents undissolved clay and lumps from passing into the final mixture. The zinc and blue are then added and the whole boiled for 15 to 30 minutes, when it is ready for use.

The great difficulty experienced in applying weighting materials is to obtain uniform results. If a certain mixture will produce certain results today, then one just like it and applied under like conditions should give the same results a year from today. If it does not, then the size is wrong. The mixture is not just the same. The amount of weight applied sometimes varies 10 to 20 per cent., but this can be overcome if proper care is exercised. The use of thermometers and hydrometers will prevent such uneven mixtures.

Weighting materials are applied to the cloth itself as well as to the yarn. Upholstery cloths, hangings, filled shirtings, and common window shades are so treated. Fig. 1 shows a piece of plain cloth having 60 threads and 48 picks per inch, taken from a sample lot of 200 yards, 36 inches wide and weighing 10 yards to the pound. This is in the grey. The cloth was first bleached, then "chased"

on a water mangle and dried. After cooling it was slightly moistened and allowed to set for two hours. It was then stretched to a little over 34 inches, the finished width, and afterwards weighted or filled on both sides on a friction starch mangle using the following mixtures: Wheat starch, 50 pounds; Farina, 40 pounds.

The above were mixed with sufficient water to dissolve them and were boiled for 30 minutes.

China clay, 160 pounds; Olein oil, (50 per cent. solution), 1 gallon. These were added to sufficient water and boiled until the clay was thoroughly dissolved. The clay solution was then added to the wheat starch solution, together with: Olein oil, (50 per cent. solution), 1 gallon; ultramarine blue, (10 per cent.), 1 quart; carbolic acid, ½ pint.

Sufficient water was then added to make 100 gallons of

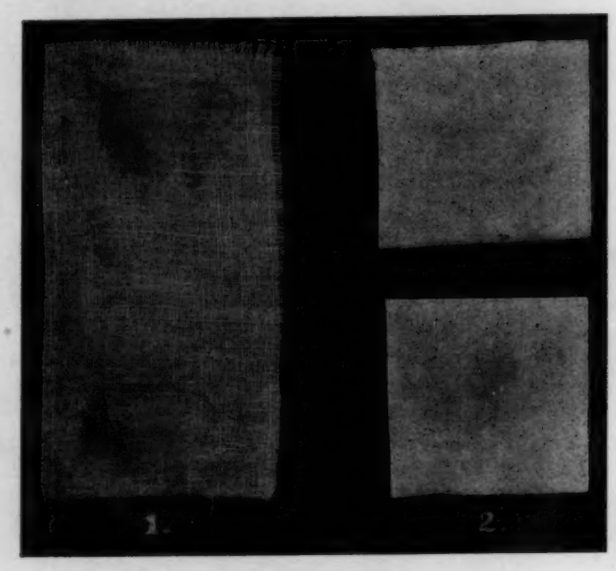


FIG. 1. UNFILLED CLOTH.
FIG. 2. SAME CLOTH AFTER FILLING, SHOWING BOTH FACE AND BACK.

mixture and the whole boiled together for 15 minutes. After filling, the cloth was partially dried on the drying machine. A small amount of moisture was left in the cloth as it was to be back filled. That is, another coat of size was to be applied to the back of the cloth.

It was then back filled on a back filling mangle with the same mixture as used in the first case. It was then dried, cooled, and conditioned on the dampening machine and allowed to set for two hours, after which it was hot swiss calendered on a six bowl, compound lever, calender, using heavy pressure when it was ready for making up. Fig. 2 shows the finished cloth. The mixing and application of weighting materials is without doubt the most important process in the manufacture of such goods.

The present buildings of the Agassiz Association at Arcadia, Sound Beach, Conn., have been presented to the association by the United Workers and are to be moved from their present site onto recently acquired land adjoining the old location. Work on the new main building is in progress, and all friends of the association who are willing to assist should communicate at once with Dr. Bigelow.

ANALYSIS OF BLACK DYED COTTON.

BY "CHEMICUS."

As black is one of the principal colors dyed on cotton, and as there are such a number of diverse black dyes used for this purpose, the analysis of such colors is a test frequently required of the mill chemist and dyer.

In the first place, it is well to consider the different kinds of black which may be met with in practice as dyed on cotton. The following summary includes about all of those appearing at the present time:

(1) Logwood black.
(2) Direct blue topped with logwood.
(3) Direct black topped with logwood.
(4) Aniline black.
(5) Sulphur black topped with aniline black.
(6) Direct black topped with aniline black.
(7) Sulphur black.
(8) Coupled black.
(9) Direct black.
(10) Developed black.
(11) Developed black treated with metallic salts.

This list does not follow the order of the importance of the colors, but is thus arbitrarily arranged to suit the convenience of the method of analysis. Logwood black has not nearly the same importance with reference to cotton dyeing that it formerly had. The make-up of the cotton will also determine in some measure the kind of dyestuff probably employed.

For the dyeing of loose cotton, sulphur black and direct black are mostly used; for skein and warp yarns sulphur black, developed black, and direct black are chiefly employed; for manufactured cotton materials, aniline black, sulphur black, and direct black are mostly to be looked for. In order to make the analysis general in character, however, we will include in the examination cotton in any of its forms, and also include all of the different blacks mentioned in the above given list.

The analysis may be carried out in the following general manner:

1. A sample of the dyed cotton is boiled for five minutes in a one per cent. solution of sulphuric acid, and then washed.

A. If the fiber by this treatment changes in color to brown and the liquid acquires an orange-yellow color, the dyestuff employed was logwood.

B. If the color of the fiber becomes a dull blue while the liquid acquires an orange-yellow color, the test shows that a direct blue dyestuff has been used topped with logwood.

C. If the fiber remains black in color, but the solution acquires a reddish brown color, there may be one of four possibilities in the dyeing, and a further examination is necessary.

A fresh sample is boiled for five minutes in a ten per cent. solution of stannous chloride (tin crystals), and the following observations are noted:

(1) If the color of the fiber changes to a bluish black while that of the liquid becomes violet, the test indicates that a direct black dyestuff has been employed, topped with logwood and an iron mordant.

(2) If the fiber remains black and the liquid is not

appreciably colored, the test indicates the use of aniline black, either alone or in conjunction with sulphur black, or direct black.

To determine which of these three possibilities is the true one, a further examination is again required. A fresh sample of the cotton material is boiled for five minutes in a twenty per cent. solution of sodium sulphide, washed well, and dried:

(a) If the fiber remains black while the liquid acquires a pale brownish yellow color, the test indicates that aniline black alone has been the dyestuff employed.

(b) If the fiber remains black, but the liquid acquires a deep olive-green color, the test indicates that the material has been dyed with sulphur black and topped with aniline black.

(c) If the fiber becomes greyish in color while the liquid acquires a reddish brown color, the test indicates that a direct black has been used and topped with aniline black.

Returning now to the more extended consideration of the first test in which the sample had been treated with the solution of sulphuric acid, we have the further possibility:

D. If the fiber remains black in color while the liquid also remains colorless, or practically so, it will be necessary to make a further test to determine the dyestuff. For this purpose a fresh sample of the cotton material is boiled for five minutes in a twenty per cent. solution of sodium sulphide, then washed well, and dried.

(1) If the fiber remains black while the liquid becomes clear green or olive in color, the test indicates the use of sulphur black in the dyeing.

(2) If the fiber remains black, but the liquid acquires a dull brown color, the test indicates the use of a coupled black; that is to say, the use of a direct dye applied after the manner of the coupling process.

(3) If the fiber changes to a greyish color while the liquid acquires a dark reddish brown color, the test indicates the use of either a direct black, or a developed black.

To further discriminate between these two possibilities a fresh sample of the material is boiled for five minutes in a ten per cent. solution of sodium carbonate, and the following observations are noted:

(a) If the fiber remains black while the liquid acquires a violet or reddish brown color the use of a direct black is indicated.

(b) If the fiber remains black and the liquid colorless or only slightly colored, the use of a developed black is indicated. To ascertain if this color has been after-treated with metallic salts, a sample of the dyed cotton should be burned to a complete ash, and this ash must then be subjected to the ordinary methods of chemical analysis to determine the presence or absence of chromium or copper. If either or both of these metals are found to be present in the ash, the dyeing has been after-treated with the corresponding salt, which would be chrome or bluestone, or both.

Imports into the United States during the eleven months ended with May aggregated $1,405,282,514, a decline of $31,788,429 from the eleven months ended May, 1910. Exports, however, increased $289,944,890, the total reaching $1,907,041,830.

SOME PATENTED SOAP PRODUCTS.

INSTRUCTIONS FOR THEIR PRACTICAL APPLICATION IN THE TEXTILE INDUSTRY.

(*Contributed Exclusively to* COTTON.)

BY S. D.

MONOPOLE SOAP.

This interesting patented product is very valuable to have in any mill, as its uses are of great variety; it dissolves readily in water, giving a perfectly clear solution even in hard water, inasmuch as it dissolves lime, holding same in solution and therefore not forming lime soap.

"Monopole" soap is neutral in its reaction, is unaffected by acids as is the case with ordinary soaps, which are easily broken by acids. It is a valuable assistant in wetting out goods, no boiling being necessary, the material is softened and no objectionable smell remains. Colored goods become brighter and blacks are very much improved in density and luster.

This soap can be used in place of turkey red oil in dyeing or printing with alizarine red, the same formula being adhered to, but instead of 5 parts turkey red oil 80 per cent, use only 2½ parts "monopole" soap. In printing the "monopole" soap yields better whites than does turkey red oil.

"Monopole" soap is capable of varied application. With turkey red oil and other fats and oils, epsom salts form a precipitate, whereas when using "monopole" soap a fine emulsion is formed and the material's feel is maintained in spite of heavy weighting. In addition to this, the stability of the emulsion is of value and the finished goods are void of any smell. In sizing, this soap can be used as a substitute for turkey red oil, fats, etc., and the finish of the goods will be soft and full and will not alter when kept in stock. If a hard and yet full finish is wanted it is advisable to replace with "monopole" soap only half the amount of fat generally used. An addition of two ounces of borax to one pound of "monopole" soap will prevent the size becoming too thick.

On account of its softening and penetrating qualities it is advantageously used in bleaching, as it prevents the formation of lime soap, thereby eliminating spots; one ounce of "monopole" soap to six gallons of bleaching liquor being about the correct amount to use.

Its excellent wetting out properties make it of value in mercerizing, the goods being first passed through a hot solution of this soap, two ounces to ten gallons, causing the subsequent results of mercerizing and dyeing to be perfectly even.

TETRAPOLE.

"Tetrapole" is a yellowish liquid, perfectly stable either in concentrated or dilute solution, and the fact of its being non-inflammable makes it safe to use. "Tetrapole" is free from chlorine, silicate of soda and soda, or any other substances that would have a detrimental effect on textile fibers. It is capable of dissolving and holding in solution dirts, fats, and oils of all kinds, including mineral oils or petroleum. "Tetrapole" does not lather like soap, does not form lime soap and is not decomposed by calcareous water, is neutral in its reaction, does not break up with acids, and can be combined with soap and soda in any proportion.

The best method for using "tetrapole" is to take for each 100 pounds of material about three pounds of "tetrapole," one pound of ammonia and two-thirds the amount of soap generally used, in this way cleansing the goods thoroughly from all dirt, grease or other impurities. "Tetrapole" will remove from goods any oils or fats that may be contained therein, and this cannot be said of ordinary soap, inasmuch as ordinary soap will not remove mineral oils. In using "tetrapole," first mix with a little cold water. It can be used at ordinary temperatures, but the best results are obtained at from 120 degrees to 140 degrees Fahrenheit. A little experimenting on the part of any interested person would quickly convince him that "monopole" soap and "tetrapole" have qualities not possessed by any other cleaning agents.

SIZING OF COTTON GOODS.*

IN RELATION TO ITS EFFECT UPON SUBSEQUENT PROCESSES OF BLEACHING, DYEING, AND PRINTING.

BY FREDERICK WHOWELL (Manchester).

Several letters and articles have appeared in the press during the past few months bearing on this subject, some of them suggesting a conference and exchange of experiences between those sections of the trades that are constantly coming into conflict over defects and damages appearing at some stage in the progress of the work before it reaches its final completion, whether that may be glazed or calendered greys, pure or filled whites, dyed, schreinered, mercerised, or printed, as the case may be. As the bleaching trade is most under my personal observation, my remarks will be particularly directed to bleaching. I have no doubt, however, that the dyeing and printing trades have had similar experiences, as what affects one must affect the others more or less, but I am hoping in the discussion that follows we shall have someone representing those two important industries to speak thereon for themselves. I may say, however, that I am not speaking personally as a bleacher alone, as I have a limited knowledge of, and association with, the manufacturing side of the question, having for over twenty years been connected with a shed successfully producing very heavy sized calicoes not intended or suitable for bleaching, etc., but made for shipment in the grey as they come from the loom, and I am also the owner of a shed engaged entirely on what are termed pure sized goods, intended to be used for whites, dyes, or prints, and where I have conducted several experiments to demonstrate that goods can be made quite as well and profitably without the use of any dangerous substances as with them. I therefore approach the matter on common ground, without any personal bias in favor of any one section as against the others.

Sizing is such a wide field that it would be quite out of the question, even were I able, to deal with all the various phases of it. There is undoubtedly a great amount of waste in using materials in what is termed "pure sizing" that do not in any sense tend to improve the weaving; are a trouble to the bleacher to take out; and only go to swell the pollution of the river, and get the bleacher into trouble with the committee of some rivers board; yet merchants often insist on their being used. On these I am not going to dwell. I am directing your attention to those ingredients that are positively injurious and damaging to the fiber of the cloth after it leaves the hands of the manufacturer and begins to be treated by the bleacher, and which of late have given such trouble to the bleacher, spoiled the cloth, caused most serious losses, and been a perpetual source of friction as to who was responsible for the damage and should bear the loss, as between manufacturers, bleachers, dyers, and merchants.

For those who are not familiar with manufacturing, I had better point out that the sizing is only applied to one section of the threads used in building up the fabric, namely, the warp, and this is done to lubricate, as it were, the threads to enable them to pass through the healds and reeds with the smallest amount of friction and prevent thereby the surfaces being fringed up by the constant passing over them backwards and forwards as each weft thread is put in from the cop in the shuttle box, which is increased in proportion to the number of picks. The weft threads, so far as I know, have not yet been put through any process of sizing. This warp is practically the cloth lengthwise without the cross threads or wefts, and is built up in a large roll of separate threads that pass through, from the winder's beam, a machine known as a tape frame, in which there is a box containing a boiling mixture of starch, clay, and other ingredients, which are often kept a profound secret to all but the particular size mixer, and is looked upon by him as his stock in trade and most carefully guarded. After being saturated in this mixture the threads are passed through a pair of rollers to squeeze out the surplus size, and then passed over a hot cylinder, dried, and put on the weaver's back beam ready for the shed. Experience has taught weavers that in a moist atmosphere the thread is tougher and weaves with far less breakages than in a dry atmosphere, when it becomes very harsh to the feel and brittle. The thread is therefore left with as much moisture in as is safe to use, and very often the shed has a humid atmosphere to further facilitate the weaving. Every weaver will tell you the difficulties he has in keeping up production when dry east winds prevail and penetrate the weaving shed. Now this moisture in the yarn and atmosphere has a tendency to encourage the growth of mildew on these weavers' beams, which are sometimes many weeks in the loom before being worked off, and it is mainly to prevent this mildew development that the use of chloride of zinc and other antiseptics are employed, which, if used in excess, cause much trouble later in the process of singeing. If, however, very minute quantities of chloride are used there may not be any trouble, but I know oftentimes there is no care exercised. The chemical is not very costly, and the size mixer, rather than risk mildew, adds more zinc, little dreaming of the serious consequences that follow if goods are to be singed.

I have chemical opinion that there should be little difficulty in getting some other less dangerous antiseptic that would be equally effective in preventing mildew and from which would arise none of the troubles following upon the use of chloride of zinc, magnesium, and calcium. The object of singeing is to remove the nap or down, caused by the ends of the cotton hairs which have not been twisted into the threads. This nap gives the surface of the cloth a rough appearance. The cloth is singed, or, as it is technically termed, "fired," by passing it at full width over a series of rows of Bunsen gas burners, or over a

*Read before the Textile Institute, Manchester, England.

red-hot plate of iron or copper kept at a bright red heat by means of a coal furnace. The particular form of damage which occurs whilst singeing is not usually detected by the bleacher until the goods come to be finished. The damage generally takes the form of irregular small holes, from one-eighth inch to one inch diameter in size, and distinctly shows all the warp threads to be destroyed and the weft threads to be sound. It is due to an injurious amount of magnesium and zinc chlorides in the warp sizing. The effect of the singeing on these chlorides is to set free an acid which tenders the cotton of the warp threads, and the after effect of the boiling alkali is to dissolve out this portion of the warp, generally leaving the weft threads quite sound. This damage is not found uniformly over the whole piece, but as a rule it only occurs in parts, causing small, irregular-shaped holes, which may be due to the unevenly mixed size or unequal absorption of the size by the warp or by the unavoidable differences of heat from the singe burners. If the amount of zinc and magnesium chlorides used is excessive, both warp and weft are affected, and I have known cases where the grey yarn has been passed through a sizing mixture containing sufficient of the substances to completely tender the cloth, so that it broke across and could not be run over the singe frame. If cloth containing these chlorides is passed through hot water to wash out the very soluble zinc and magnesium chlorides, then dried and singed, there is no danger of damage. This damage can easily be demonstrated. If the grey cloth that contains this excessive amount of zinc and magnesium chloride is heated strongly with a flat-iron of such temperature that it will just give white calico a brown shade without tendering it, it will then be found that the warp threads break easily, and that the weft, which is unsized, remains quite sound; such a cloth is likely to give trouble if well singed.

The limit of safety for these chlorides appears to be from one-fourth to one-half per cent of the solid chlorides per 100 lbs. of grey cloth. I draw your attention to this form of damage, as it has often been wrongly attributed to a purely mechanical bleacher's damage, such as occur when grit or very small stones get into the washing machines. These also cause small holes, but in this case both warp and weft are broken, and the general character of the damage is different, a mechanical damage giving a rough edge, whereas the chlorides of magnesium and zinc usually come out a clean-cut appearance. The warp sizer may be using ready-prepared mixtures containing magnesium and zinc chlorides unknown to him. I have known cases where damage of this nature has occurred through these preparations being used in sizing. The amount that will cause damage is small; the magnesium and zinc chlorides are supplied as very strong liquids, so that a few extra quarts in the mixing may easily be over the safety margin. Fine goods, which are required to be well stretched to obtain width, will enlarge the damage, causing long splits in the cloth. It is understood that chloride of calcium is a safer substance to use than zinc or magnesium chlorides if the object is to impart a mellowness to the thread, but I am of opinion that it would be possible to substitute for these chlorides some other substance that would be quite safe for singeing.

Another cause of serious trouble to the bleacher arising from sizing materials is due to the presence of paraffin wax or other similar unsaponifiable substances in the warp sizing; this may also occur without the knowledge of the sizer who sizes the goods. Some samples of sizing tallow which I have had tested have contained as much as 25 to 50 per cent of waxy matters other than tallow. I have recently had tested a substance largely used by warp sizers which contained 94 per cent of unsaponifiable matter, such as paraffin wax, mineral oil, and vaseline. The nature of these substances is such that they do not combine with the alkali liquors used in bleaching, whereas pure tallow does, and forms a soap that can be washed out. Paraffin wax and such substances are simply loosened by the heat of the kiers and often collect together, partly rising to the surface of the liquor in the kier, and partly forming patches in the cloth, which collects dirt and resists all endeavors to boil out, causing opaque, greyish-looking stains which are impossible to remove. In other cases, a small amount of these unsaponifiable substances remains evenly distributed over the surface of the cloth, making it impossible to get the firm, full finish which can be obtained when the cloth is pure and well bleached. The wax acts as a softener, and the cloth remains quite limp and flabby after calendering. Mineral oils used in lubricating and getting on the cloth have a similar effect. It will remain quite soft in those parts, the rest of the cloth finishing up quite firm. We have known cases where the steam used for boiling up the size has come from the exhaust pipe of an engine, and contained sufficient mineral oil to resist the bleaching processes, and I have had a striking instance of this trouble from the use of condensed water from the steam engine. The very small amount of mineral oil remaining in the cloth has the effect of preventing the desired finish from being obtained.

I have endeavored to put before you in a condensed form the chief causes of damage which the bleacher attributes to the results of processes in the hands of the manufacturer. It will, I think, be evident that the claims and costs resulting from these damages, though largely settled by the bleacher, are necessarily injurious to the trade as a whole. I think that by exchange and discussion of opinions on these matters, and by co-operation among the different branches of the textile industries, much might be done to lessen some of the difficulties that are met with in the various processes.

Not only in Lancashire has the trouble been felt, for I find that paraffin wax is being banned on the Continent. A recognized authority, M. Scheurer, has reported that he considers paraffin is the product which exercises the most powerful action in resisting the impregnation of cotton with liquids. One local writer on singeing says: "Tallow, on account of its price, cannot be much used now," and follows, "I am using what is commonly called 'Yorkshire Grease,' and have never had any complaints." That may be so if it is guaranteed free from acid and mineral oil. But let me here give a word of caution to those who think of using Yorkshire grease. If the guarantee is bona-fide and reliable, well and good, but I have found some of these "Yorkshire Greases" absolutely unfit for use in sizing.

If you refer to the *Journal of the Society of Dyers and Colourists* for March you will find a reference to these difficulties taken from the proceedings of the "Societe Industrielle de Mulhouse" as follows:

"Protest by ten Bleaching, Dyeing, and Printing Firms against the Abuse of Mineral Oils in the Lubrication of

Looms and of the Driving Gear of Weaving Sheds, etc., etc.," concluding, "In consequence, it may be assumed as fully demonstrated that mineral oil stains resist all known systems of bleaching."

Also in the *Textile Recorder* of January 14th, 1911, page 327, appears the following:

"This fact in itself demonstrates that such oil stains resist all the known systems of bleaching. * * * Experience has, however, shown that it is not always so, and that this proportion varies according to the nature of the oils employed in the mixture. In these circumstances it is necessary, for the present at any rate, and until some curative remedy is discovered, to condemn the use of mineral oils of all sources in the spinning and the weaving of goods for bleaching, dyeing, and printing. * * * Another cause of the production of stains which absolutely resist all bleaching operations and agents is the use of paraffin wax in the sizing of the warps or at the loom. This practice appears to be very general amongst weavers, and should receive the most stringent condemnation. The same end in view may be obtained by the use of soap. The bleachers signing this note of protest declare that there is no known method of bleaching efficient in effecting the removal of mineral oil stains. Therefore they protest against the use of pure mineral oils for the lubricating of the looms and the transmission gearing, and ask all weavers either to renounce altogether the use of paraffin wax or to make for themselves the mixture of colza oil and Scottish petroleum specified. * * *

"* * * Scheurer has reported that he considers that paraffin is the product which exercises the most powerful action in resisting the impregnation of cotton with liquids. Turning to the study of mixtures of tallow and paraffin, he finds that such a mixture strongly opposes saponification during the course of the lye-boil in the bleaching. Indeed, it offers a most remarkable resistance to this operation and the others connected with bleaching."

A DEFINITION FOR INDIGO BLUE.

(*Contributed Exclusively to* COTTON)

BY FREDERICK DANNERTH, PH. D.

As the term "Indigo Blue" is in numerous instances used to designate colors of the same appearance but of widely different wearing qualities, it seems very desirable that manufacturers as well as jobbers indicate clearly what they mean when specifying "Indigo Blue." A little foresight in such matters would make unnecessary the suits at law which consume so much time and money. In the hope of obtaining an expression of opinion on this subject a European contemporary recently put to its readers the following queries:

(1) Does the manufacturer of colored fabrics consider "Indigo blue" only a trade term for a mixed Indigo blue (an impure Indigo blue)? Is it a trade custom to allow the manufacturer to put an immedial blue bottom on the goods and then "top" with Indigo?

(2) Is immedial blue just as fast to air, light and washing as pure Indigo?

(3) Is the cost of producing immedial blue shades on cotton less than in the case of Indigo (compare shades of equal depth).

(4) If a consumer desires "pure Indigo blue" dyed fabrics, is it necessary for him to especially emphasize the "pure"? If a manufacturer was selling a fabric dyed with nothing but Indigo, would he style this fabric "pure Indigo blue"?

Among the letters sent by the readers of the journal were the following:

(1) "The term Indigo blue indicates but one color. It is the blue produced with natural or artificial Indigo,—vat dyed. Colors which have been produced with a properly dyed "bottom," (sulphur colors such as immedial blue), and then 'topped' with Indigo blue, may be faster to soaping and crocking than a pure vat blue, and the fiber may have a better 'feel,' but colors so produced are properly designated 'Indigo with bottom.' The term Indigo blue if applied to such fabrics, is misleading. Sulphur blues, when properly dyed, are in many cases preferable to Indigo insofar as fastness to washing, rubbing, wearing and light are concerned. After repeated washing and drying and exposure to light it will be noticed that well-dyed Indigo fabrics become paler but lose nothing in brilliance of color, (this is especially the case if the goods have been passed into a weak vat many times and allowed to 'green' slowly). Sulphur blues do not lose in depth of shade but gradually assume a dull slate shade. The Indanthrene blues and Ciba blues do not undergo such a change. If an Indigo blue be dyed with a few passes on a weak vat it can be produced cheaper than a sulphur blue, but if the goods are given many passes in a weak vat, the Indigo blue will be more expensive than the sulphur blue. Sulphur blues are excluded for pale shades as these do not come up with the brilliancy of Indigo blue. The modern sulphur colors produce more even shades than Indigo. It should really be immaterial to the consumer whether this or that dye was used by the manufacturer,—the chief point it that the color be good. It is for this reason that the dyer should not be obliged to inform the consumer as to the dyestuffs used by him for producing any particular shade. If the consumer demands a pure Indigo blue article and not merely a 'fast blue' the dyer is not privileged to use any substitute. If the dyer uses the designation 'pure Indigo' or 'guaranteed Indigo' he is certainly not privileged to apply another dye as a 'bottom.'"

(2) "As used in the trade, the term 'Indigo blue' does not necessarily indicate a color produced with 'pure Indigo.' Immedial blue and Indigo blue are equally fast to most influences. The former is however faster to crocking, while the latter is faster to chloring. The relative price of producing these colors cannot be answered unless the particular location and conditions of the dyehouse are known. If an 'Indigo blue shade' is ordered it will be advisable to put a sulphur blue bottom on the goods and give brilliance to the color by the use of the vat blue. If the color be produced with a sulphur blue alone the cost will be greater because it is necessary to 'whizz' well and then develop the color by steaming, hanging, or treatment with sodium peroxide. If the vat is carefully prepared better results will be obtained with more certainty if Indigo is used. If the consumer desires to buy 'pure Indigo' dyed fabrics it will be necessary to emphasize this. Manufacturers of cotton goods apply the term 'genuine Indigo' or 'pure Indigo' in those cases where no other dye has been used. In other cases the term 'Indigo blue' is used."

(3) "The term 'indigo blue' as used by firms dealing

in good faith, means but one thing and that is a blue produced entirely with Indigo."

(4) "It may be said in general that the term 'Indigo blue' as applied to dark shades of blue on yarn does not indicate a 'pure' Indigo, but rather a ground color topped with Indigo, or as is most frequently the case,—an Indigo blue is topped with logwood in order to increase the fastness to rubbing. The advantage of Indigo dyed goods lies in the fact that the shade remains, even though it may lose in intensity by frequent washing. The greenish cast of the blue will be retained until the fabric is destroyed. In the case of coal tar colors prepared from aniline derivatives, the colors frequently undergo a chemical change when washed repeatedly with soap and water. The fastness of pale shades of Indigo blue to light and air is inferior to that of sulphur blues. It is easier to produce level shades with immedial blue than with Indigo, and if deep shades are to be produced with pure Indigo the cost will be greater than in the case of the sulphur blue. If the buyer calls for a "pure Indigo" the manufacturer will of course be obliged to refrain from using anything but 'pure Indigo' and it is frequently the case that a higher price is paid for heavy shades of pure Indigo. Especially is this the case with towels and other articles containing only blue and white. Such goods are frequently tagged 'pure Indigo' and then command a higher price."

After noting this expression of opinion and hearing the widely different points of view held by consumers, dealers, jobbers and manufacturers, it seems rather desirable that all concerned should specify clearly what they mean to indicate when ordering fabrics fast to light, or soaping, or chloring, or weather. This done, it would be superfluous to specify Indigo blue or sulphur blue or any other blue, for the "fastness" properties of the dyestuffs at the disposal of the dyer would in any case limit him to certain dyes. On the other hand the buyer would attain his end for the aim is after all to produce goods possessing certain "fastness" properties and not certain "chemical properties" as some seem to think.

LOGWOOD STEAM BLACK.

(*Contributed Exclusively to* COTTON.)

BY M. T. S.

The following practical formula for a logwood steam black will no doubt prove interesting to the readers of this department of COTTON. In order to make the example as clear as possible for the finisher we will take the cloth as it comes from the mill and carry it right through the plant to the finished case. For this example we will select five tons of 64x64 grey cloth, 30 inches wide. Sew the pieces all into one rope, as is the usual practice in the bleachery, and singe them. Then wash into a kier with 150 pounds of soda ash dissolved in water. Run this ash into the kier together with 100 pounds of soap previously dissolved. Fill the kier up with water until there is five feet of liquor in the kier. Then put on the cap and boil twelve hours. Wash the goods into bins, open and dry up, running the cloth onto rolls as it comes from the drying machines. Then take the goods to a double pad machine with a set of cans attached. Arrange a 300 gallon tank in a suitable position over the padding machine so the liquor will flow to the machine as wanted. Form the liquor from 90 gallons of extract of logwood, 30 pounds of corn starch, and 260 gallons of water. Boil all this together and when it is thoroughly boiled up run the liquor into the padding machine and give the cloth a bath in this liquor, allowing the cloth to go right on the cans and dry immediately after leaving the padder.

Then take the goods to another double padding machine, preferably with a steam box and a mangle attached and with a 300 gallon tank in some convenient location to the padding machine. For this mixing use 90 pounds of bichromate of potash and 15 pounds of sugar of lead, with 260 gallons of water. When these have been thoroughly boiled together run the liquor into the padding machine and give the cloth a bath in this liquor. As the cloth leaves the chrome bath, have it run right through the steam box to the mangle and into a box.

Next take the goods to a water mangle and starch mangle running double, and arrange to have a 200 gallon tank at the starch mangle for the starch mixing. To prepare this mixing take 200 pounds of Sago starch and 12 pounds of bone grease, to which add 175 gallons of water and boil until cooked. Then run the goods through the water mangle and starch mangle and take them to the drying machines for drying. They are then ready to go to the sprinkling or dampening machine, after which they are batched on a shell. Run these goods through a five bowl calender giving the cloth four nips unless it is desired to secure a higher finish, in which case the use of a friction calender will simplify the proceeding and one nip would suffice. The goods are now ready for the yarding machine and packing room.

The Bureau of Manufactures is in receipt of a communication from a business man in Germany, who was for many years connected with an American consulate, stating that he would like to get in touch with reputable firms in the United States with a view to acting as their agent in that country. He writes that he is especially interested in hardware and textile goods. For further information apply to Bureau of Manufactures, Washington, D. C., and refer to File No. 6872.

A report from an American consul in the Near East states that a request has been received from a prominent local firm of importers to place it in communication with American manufacturers and exporters of cotton goods, such as T-cloths, cabots, sheetings, etc., rubber overshoes, cheap watches and metal cases, agricultural implements, wire nails, and typewriting machines for writing English, French and Arabic. Correspondence may be in English, German or French. For further information apply to Bureau of Manufactures, Washington, D. C., and refer to File No. 6881.

A prominent importer in the Levant informs an American consulate that he desires to be put in communication with American manufacturers of cotton goods, such as T-cloths, cabots, sheetings, etc. Samples should be forwarded, discounts stated, and quotations given c. i. f. certain city. For further information apply to the Bureau of Manufactures, Washington, D. C., and refer to File No. 6888.

Practical Problems Discussed by Cotton's Readers.

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all.

BLEACHING AND FINISHING PROCESSES.

E. D. JEFFERSON.

"Maximus," "M. T. S." and "K. W. G.," from the laundry man's point of view, have recently used the columns of COTTON discussing the responsibility for much of the defective bleached and finished cotton fabric found in the market. To place the subject in a clear light before those who may be interested, it is well to remember that a boil of 12 hours with 3 per cent caustic soda is longer and rougher than necessary, and a reboil after a brown chemic treatment will result in a great weakening of the fabric. This last boil is perhaps a usual resort for the purpose of removing defects brought about by an imperfect boil in the first place.

The following prescription for a double boil will be interesting: With a five-ton Jefferson kier, use one per cent lime and boil six hours; run over into an ash kier with 1¼ per cent soda ash and boil six hours; then run through chemic of 3/5 of 1 per cent. This double boiling is completed in 12 hours at a cost for alkali of $3.50, or 70 cents per ton. If any reader thinks that the above is written merely for the sake of saying something, whether he is a bleacher of long experience or a converter who wishes he could find some way of increasing the strength of his finished fabrics, the writer is ready to refer the converter to those who are doing bleaching on that basis every day. He will also guarantee absolute satisfaction to any bleacher who cares to save money and expects to produce the best fabrics.

Fabrics bleached by this process will be left in the best condition for finishing and wear, at a cost which leaves a handsome margin of profit, and they will stand a wash or two in the laundry.

Compare the above prescription with the following recently given under the same title as this article: "A five-ton kier; use 3 per cent caustic and ¾ of 1 per cent soap; boil 12 hours; run into an ash kier with 2 per cent soda ash, .4 of 1 per cent soap and ¼ of 1 per cent caustic, and boil 9 hours; then chemic at 3½ twaddle."

The difference between the two prescriptions is worthy of consideration. This last requires 6 per cent alkali and 21 hours' boil at a cost for alkali and soap of $20.35, or $4.07 per ton. For a further comparison of the two processes, let it be supposed that the goods "go" all right in the market and nobody cares whether they are as strong and durable as they might be. There is a difference of $3.32 per ton of goods in cost of alkali, amounting to between $4,000 and $5,000 or more per kier per year, to say nothing of the additional expense of steam and other items for a 21-hour boil over a 12-hour boil. This would seem to be worth consideration by anyone who had a chance to pocket any considerable portion of the $4,000.

This article is not written for the purpose of criticising the use of chemicals of any kind, but to show the ambitious bleacher what can be done on any goods made in America.

It may not be out of place to state here as a note to this article that grey cotton fabrics should never be weakened by boiling in the bleaching process. If there is any change they should show an increased tensile strength. So many goods are weakened in the finishing process that it is commonly believed that bleaching impairs the strength of cotton goods. As a matter of fact, if they are properly boiled there will be no weakening.

SOME QUESTIONS FOR THE BLEACHERY MANAGER.

BY M. T. S.

In the April issue of COTTON, I note an article on page 241 headed "The Bleachery Manager," in which the author makes some statements that I would be glad to have some further information upon.

Suppose that in this continuous passage from kier to kier there are about 300 pieces of cloth in process. It would be equally as well to take the example from kier to white bins, as there would be about the same amount of cloth. Suppose these 300 pieces average 55 yards to the piece, and as all white goods has to receive two boils, it is my experience that there will be small troubles, such as breakdowns or tangles in the cloth or an occasional belt breaking and many other little troubles during the process where it would be necessary to have one machine stopped for perhaps twenty minutes to an hour, as the case may be. I desire to know if it would make any difference between the cloth that is in process and the cloth that is in the kier or in the white bin, when the machine is stopped for say thirty minutes, and if there are any differences, what are they?

This writer also makes the statement that a lot of cloth may be taken from the grey room to the shipping room intact. In the average bleachery, one kier of cloth of say 1,050 pieces all of the same count, for example, 72x80, 40 inches wide, the orders will call for 350 pieces to be finished white; 350 pieces to be printed; and 350 pieces to be dyed. Now suppose the printed cloth is to be of one pattern, but using seven different colors, 50 pieces to the color. With the dyed cloth, we will suppose that seven shades and 50 pieces to the shade are wanted. That now leaves us with the 350 pieces of white which could probably be taken to the shipping room intact if no trouble occurred on the way, but if I understand the gentleman right in his article, he is in a position to take the whole 1,050 pieces to the shipping room intact, and if this can be done from the grey, I desire to have further explanation as to how it can be done.

It seems to me that it would be next to an impossibility, with a reasonable amount of care used in the bleach-house, to succeed in getting a lot mixed up, as this writer says that it is mixed with the ordinary processes of bleaching. Another statement made by this writer is that when the goods gets to the finisher they put him to his wits end to get a uniform finish. The cause of this unevenness in the goods is laid to the fact that part of the goods remain in the chemics or sours longer than other parts. My experience in a bleachery has been that the boiling had a great deal more to do with the uniformity of the goods than any of the after processes. My experience has also shown me that starchers and dyers occasionally have trouble with uneven goods through faults in their own department, but that is another story and is not one of the points at issue in this letter.

THE RAILWAY HEAD.

BY B. M. P.

In the June issue of Cotton "Manager" explains his position very neatly, and naturally throws all the blame on his critics. Now, as one of his critics, I want to state one or two facts in connection with the railway head and his so-called "improved" railway head.

The trough, connecting the old stationary top flat cards to the railway head, was always, from the very start, spoken of as the "railway trough," and the machine at the end, that combined, reduced and evened the slivers, was spoken of as the "railway head." These are the names that were used by the builders themselves, and, as they built and sold the machines under the above names, I suppose we must follow suit and use those names if we wish to be correct. The cards and railway trough were sold together, sometimes as a unit and sometimes as a separate sale; that is, the cards were sold at a certain price and the railway trough at so much per foot. The railway head was always a separate transaction, both as to the machine and also in the manner of selling. If any one had put in an order for so many railway heads and expected to get the troughs with them, he would have been badly fooled. The "railway head" has been called by this name from the first and not as "Manager" states. These are the facts in regard to the "railway trough" and the "railway head," and any one can prove the same by taking a little time and trouble.

Now in regard to the word "improved" which was placed by "Manager" in front of the words "railway head," which he thinks every one must use unless referring to the old type of machine in use with the railway trough. This combination might have been used in the past to some extent and also by some people now, but let us see what the general custom is now among the machine builders themselves, and they certainly ought to know what their own products are named. You cannot pick up a late catalogue of any American machine builder, with one exception, and find where he refers to the railway head as an "improved" railway head, although he is illustrating and describing the modern type of railway head that takes its slivers from cans and not from a railway trough. The exception noted above is a case of the word "improved" being stuck in front of the words "railway head," "drawing frame" and "spinning frame," and naturally means the latest thing this particular builder has to offer in these different classes of machines. Now if the word "improved" in front of "railway head" must always mean a certain type or style machine, what does it refer to when used in connection with the other machines noted, or where is the exclusive distinction of its use in the case of the railway head?

Again, let us take a look into all the modern textile journals and see if we can find the word "improved" used in connection with railways or railway heads. You will immediately be struck by its absence. Not a single advertisement refers to "improved" railway heads, but we do see "improved" drawing frames and fly frames advertised. The word here simply means the latest thing that the builder has to offer in that particular class of machines. A good many of the advertisements refer to railways and railway heads, and because the word "improved" is not used, "Manager" would have us all believe that the builders were referring to the old type of frame that was pronounced obsolete by the majority of cotton manufacturers years ago, and was discarded upon the introduction of the revolving flat card.

The railway head, as now built, is sometimes called the evener drawing frame, but its most common name, and the one in use by the machinery builders, is the railway head, and we must stick to this name if we wish to be correct. The modern type of the machine goes by that name, and it is not necessary to use the word "improved" in front of its name to convey your meaning clearly, regardless of what might be "Manager's" opinion.

The following is taken from "Manager's" article: "The use of the improved railway heads are to take the slivers from the revolving flat cards or any card using a coiler, and even up the work from the cards with the back roll instead of the front roll, as provided in the railway head." Now this statement is incorrect, in that it leads the inexperienced to believe that there were no so-called "improved" railway heads that did not do their evening by changing the speed of the back rolls, when in reality there are several makes of railway heads that have a constant speed to the back rolls and the front roll is driven through the evener cones and has a variable speed, depending upon the position of the cone belt. There are railway heads of this type in use all over the country, built by several of the leading machinery builders.

I have heard of only one case where drawing frames were used with five lines of drawing rolls, and that "experiment" was a failure on account of the extreme weakening of the fibers by the rolls. So far as I have ever been able to learn, no machine builders in this country have ever turned out a similar style of drawing frame. I would like to know where "Manager" saw these frames, and their make.

As I have never heard of the revolving flat cards being connected by a railway trough to a railway head before, I would like to know the make of the same, the speed and diameter of the doffers. I know cards of the latter type do deliver their webs to troughs which carry the carded material to the dye room, but I have never heard of the above connection before.

I am not writing this for the sole purpose of trying

to find fault with some one's statements, but for the sake of what I believe to be the truth. Some years ago I subscribed to several textile journals, started a scrap book and cut out and saved many clippings from the discussion pages of one journal in particular. These were carefully indexed and saved. Since then I have found that a good many of those taken at first were worthless, from the fact that they were not correct, and I had several clippings some time before I discovered this. I don't think the facts in this case under discussion are entirely with "Manager" as I have tried to point out, and for this reason I have written the above.

REDUCING COSTS IN THE CARD ROOM.

BY W. M. S.

There are many ways of keeping down costs in the card room, one of the best of which, to my thinking, is to take proper care of the machinery in general. By doing this we reduce the cost of the supplies, for we must remember that this is a large source of expense. The overseer of the room cannot be too careful about buying supplies for his room. He should know which kind of supplies are most often broken in his room and be careful to order the right ones. I have been in supply rooms and have seen supplies bought for frames that I knew would not be needed in a long time. This, of course, is not an economical way to buy supplies and does not tend to keep the cost down in the supply room. I have also gone into card rooms and seen supplies broken off the frames, such as gears, bolsters and bobbins, as well as many other items, which is, of course, all wrong.

All machinery should be well oiled every day in the year. Bad oiling causes delays. Then again, the fixer should be a very careful man; if he is not, he will certainly break the machinery, causing new outlays for supplies. Careful fixers can, if they will, save much money for the company by keeping small things fixed at all times, especially about the frames. Now the careless operative does not help keep down the cost if he breaks up the machinery. I have seen drawing boys batter up the trumpets on the drawing because they were choked up, and soon they would have to be dressed out, after which they would be found to be too large and would necessitate the buying of new ones.

An overseer should be careful to see that his top rollers are first covered properly, and then they should be put on the frames and taken care of. Roller coverings cost money, and by taking care of them the cost is kept down considerably. One of the main duties of an overseer is to watch his operatives in order to see that they are careful with the machinery at all times. I have myself seen operatives break up new bobbins because they would not fit the bobbin gear. It would have been a simple matter to have cut them out with a knife and made them all right. In short, there are many ways of keeping down the cost in the card room, and one of the principal ways is to enforce carefulness among all operatives.

The Hoffman-Corr Mfg. Co., of 413 Market street, Philadelphia, would like to correspond with any mill making tobacco cloth for covering tobacco, together with their samples and prices.

WORKING OLD AND NEW COTTON.

BY H. W. C.

Some time ago I had one bale of old and one bale of new cotton, both of the same weight, run through a drying machine under the same temperature. The result was that the new cotton lost 13½ per cent. of moisture, while the old cotton lost only 7 per cent., making a difference of 6½ per cent. more moisture in the new cotton than in the old. From this fact, it seems to me wrong to use the old and new cotton together, as I believe they will draw uneven. My method, therefore, is to get one bale of the new cotton, open it, remove the ties and bagging, loosen it up and let it air three days; then run it through, make it into yarn and get my bearings. When I get orders to run the new cotton, I first run out the old cotton, then follow it with the new, and from experience, I know where to make changes which will produce the best results.

To get a good, smooth yarn, cotton must be even in staple, well aired, and run smooth in picker room, card room and spinning room. New cotton will run heavier than old cotton on account of the moisture in it and because of this same moisture it does not clean as easily as old cotton, nor does it draw as evenly. Usually the laps will split, "lick-up" causing the laps to run on the pickers and cards, both single and double. This sort of work will cause very uneven yarn. It can usually be overcome, however, if new cotton is run straight, but when new and old cotton are mixed together they must take the former course.

I think one very good plan is to get enough bales of cotton with which to run your room for a week or at least for three days, then place the bales around the mixing bin after having all the ties and bagging removed and let the cotton lie for a day. Then put four hands in the bin, working thus: have two throwing small rolls of cotton into the bin, while the other two men are in the bin loosening up the cotton as it is thrown in. Use a few different bales of each different lot or of different marks, having the grade and length of staple as nearly alike as possible, using new cotton straight and old cotton in the same way.

Should I have a quantity of old cotton when the new cotton comes in I usually keep back the old cotton for the finer numbers and use the new cotton for coarser numbers. I also get bales of cotton in sufficient quantity to make a mixing which will last thirty hours. I use a few bales of different lots but of the same grade and color, and as nearly as possible of the same length and diameter of staple and place these around the mixing bins. This method will result in thoroughly mixing the cotton, at the same time one bin is airing while the other bin is being used, thus allowing both lots to air, also securing an equalization of moisture for the whole lot. I never alter the weights of my laps unless I have to make finer or coarser yarn. I usually do my changing on drawing frames or slubber.

I think it a very good plan for an overseer of carding to give more attention to the picker room, making it a practice to watch a few finisher laps from the machine, then weighing them himself. I go into the picker room, have finisher laps weighed, and I weigh a yard from every finisher picker machine once a day. Every lap from a finisher picker should be weighed and nothing over or under one-half pound off the standard weight should be allowed to go to the cards.

THE PROCESS OF CARDING.

BY WM. H. DOOLEY.

The process of carding, as carried on at the present day, embraces three distinct operations; opening, scutching and carding proper. The primary function of opening is to open out the matted masses of fiber and remove the heavy impurities, such as sand, husks, leaves, etc. Immediately following this comes scutching, which is merely a continuation of the opening operation, by which the fiber is cleansed more thoroughly and delivered in the form of a wide lap, ready for the succeeding process. Carding proper, which comes next in order is generally regarded as one of the most beautiful and instructive operations carried on in a modern mill. The process of opening out the cotton is here continued to such an extent that the fibers are practically separated each from the other, and while in this condition very fine impurities are removed, and many of the short and unripe fibers which are always more or less present are also gotten rid of.

The several objects sought to be accomplished by means of the carding engine are as follows: (1) The removal of a large proportion of any impurities, such as broken leaf, seed and shell, that may have escaped previous processes. (2) The disentanglement of the clusters of fibers and their reduction to such a condition that the subsequent operation can lay them in parallel order. (3) The extraction of a good proportion of the short, broken and unripe fibers, present more or less in all cotton grown, and which are practically worthless from a manufacturing point of view. (4) The reduction of the heavy lap or sheet of cotton received from the scutcher, into a comparatively soft, continuous rope or strand, technically known as the "sliver." Ordinarily, one yard of the lap on entering the carding machine weighs over one hundred times as much as the "sliver" delivered from it.

There are several varieties of carding engines, but in each case nearly all the essential features are practically the same in one as in the other. In the main, the parts which operate upon the cotton in its passage through this machine consist of a number of cylinders of rollers of various diameters. Some of these are merely to guide the cotton forward, but the more important are literally bristling all over with fine steel wire teeth, whose duty it is to open, comb out, and clean the fiber as it passes through them. Just to convey an idea of the closeness with which these wire teeth are set, it may be said that it is quite common to have on the cylinder as many as 600 teeth in one square inch. These, by means of special machinery, are fastened into a rubber or cloth foundation, which latter is wound tightly around the surface of the cylinder. Upon a cylinder 40 inches wide and 50 inches in diameter there are over 3,800,000 wire teeth, each about one quarter of an inch long.

Immediately over the cylinder and surrounding about one-third of its circumference are placed from forty to fifty "flats." These are simply narrow iron bars, about 1½ inches wide, each being covered with steel wire teeth in the same manner as the cylinder, and extending across the width of the same. The steel teeth of the flats, being set so close to those of the cylinder as to almost work against them, catch hold of the cotton as it passes and not only comb it out and straighten it, but they also retain the short fibers and fine impurities. Having passed the flats, the cotton is deposited by the cylinder on what is termed the "doffer" in the form of a wide, thin lap.

This fleecy sheet of cleaned cotton is stripped from the doffer and collected in the form of a loose rope or "sliver" about one inch in diameter. In this condition it is ready to be drawn out and spun into yarn by means of the drawing frame. When an extremely fine and strong yarn is required, in addition to carding, the fibers are also subjected to the process of "combing." This may be said to be merely a continuation of the carding process to a much more perfect degree. The chief object is to extract all fibers below a certain required length, and cast them aside as "waste." There is as much waste made at this stage of manufacture as that made in all other stages put together, that is, about 17 per cent. It will readily be seen that this is a costly operation and is limited entirely to the production of the very best and finest yarns, such as those intended for sewing thread, fine hosiery and underwear, and fine grades of white goods.

IMPORTS OF COTTON INTO ROUEN.

Rouen, with its surrounding district, is one of the three centers of France for cotton manufactures, and while the port owes its rank as the second of all France in the amount of tonnage handled to imports of wines, coal, lumber, and petroleum, it is nevertheless only a port of transit and is dependent upon the cotton industry for its material well-being. As far back as the middle ages the manufacture of cotton tissues was an important industry in Rouen, having been fostered by a grant of Louis XIII, who gave to Marseille and Rouen the special right to import cotton from foreign countries. Gradually, as her merchants became more and more immersed in the manufacture of cotton Rouen paid less attention to the details of importing, and with the increase in the size of trading vessels navigation by the Seine became more difficult. Havre grasped this opportunity and immediately began harbor improvements and established a cotton exchange or market. By the middle of 1800 all direct importations into Rouen had ceased so completely that when a vessel arrived from New Orleans in 1852 with 1,657 bales the occasion was celebrated and heralded as the return of direct importations, due to the efforts of Rouen in improving the course of the Seine. This was a vain hope, however; no further direct importations were made and Havre was firmly fixed as the center for the imports and sale of cotton.

At present cotton is imported into Havre, bought and sold there, and then transhipped by rail to Rouen. To overcome this unnecessary expense of transhipping and to put the local manufacturers in closer touch with the raw-cotton market, direct imports are urged.

In 1909 the total imports for Rouen were nearly 4,000,000 tons, of which raw cotton furnished only 1,456 tons, yet the value of its cotton manufactures in that year exceeded $36,000,000. There are 52 cotton-spinning mills, employing 11,760 men; 54 cotton-weaving establishments, with 10,091 employees; 9 factories for printed tissues, with 2,033 men. The output for 1909 was as follows: Spinning mills, $17,370,000; cotton-weaving establishments, $10,229,000; printing tissues, $8,685,000. Statistics at the customhouse

show exports of only 103 tons of spun cotton and 2,323 tons of cotton tissues, so that a large export of spun cotton and tissues went through Havre or Marseilles or, grouped with other merchandise, via Paris. If imports were direct and the raw cotton market here, Rouen would not only have a large import trade but she would also act as her own seller and exporter, with consequent benefit and lessening of cost by cutting out the middlemen's profits.

The situation of Havre and Rouen may be compared with that of Liverpool and Manchester when the latter was dependent upon the former for its raw cotton, before the opening of the Manchester ship canal. Conditions at Rouen are, however, more favorable for direct importations than at Manchester, for Rouen has the Seine with its improvements already made, so that vessels up to 24 1-2 feet draft can pass. Within two or three years, when improvements now under way are completed, vessels up to 28 feet draft will be able to pass through the Seine at any time. The harbor of Rouen has been dredged so that it has a depth of not less than 26 feet at lowest tides, while the quays are furnished with excellent facilities for loading and unloading, and are connected by spurs with the main railroad lines running to Havre, Paris, and all the northern and central parts of France. The work of enlarging the harbor and adding to the quay frontage is constantly going on, so that a large area of dockage is added each year.

GOOD RUNNING WORK.

BY W. W. C.

I find in most mills that proper care is not taken of the raw material. First, this is shown in buying, and secondly, it is evident in the kind of help employed. In many of the mills the cheapest possible help is selected, but I think this is a very serious mistake, for in both these cases there cannot be too much caution and careful consideration.

It is a well known fact that if the stock is not started right, it is sure to give trouble all through the mill and the increase of waste and the percentage of seconds, will also be most marked. It is good business policy, therefore, to get the work done as cheaply as is consistent with having it done right, for it certainly is not wise to save five cents at the beginning and lose 100 cents in the end. This is being done now by a great many mills which not only use cheap help, but use a shortage of machines and will run these few at too high speed in an effort to make them keep up to the desired amount of output. This will not only shorten the life of the machine but will cause bad work. It is very necessary to have ample machines in each department and to run them at a moderate rate of speed, and if this is done, with the right man at the head of each department good results will surely follow.

The mills that are now realizing these facts are the ones which will take the lead in the future. One man cannot make a mill run satisfactorily by himself, but all must do their duty in order to get the best results. Even though one man might look after his department in the best possible way, if the others are careless about their work, the result must be bad.

The mills which get the best results are those where all the men, from the President down are on good terms, even though they may not always agree on every point, this need not mean that they are unfriendly. Everyone should be respected in his or her position, whatever that position may be.

Then, too, there is not enough attention given to making the work run well, and this is a case where a few dollars and cents should not be considered, for bad running work makes poor help and mean men. If the work of one hand runs badly he gets angry, then the man he is working for comes round and complains that the hand is not keeping up his work. All the time the worker may be doing the very best he can, but he gets in trouble just the same. Possibly he may even go off and give the mill a bad name, when if the work had been running as it should have done, nothing unpleasant would have happened.

I have found that if a man will look after his work and keep it running right he will not have much trouble with his help. There is much work which should be done outside of the mill to help keep the people satisfied and to enable a mill to retain good operatives. But, after all, I find the most trouble comes up in the mill, so the best way to keep good contented help is to keep good running work; treat your help right; pay them for what they do and you cannot fail to get good results with but little trouble.

THE POWER PLANT IN THE COTTON MILL.

BY W. R. P.

Power plants in cotton mills are almost universally regarded as necessary evils, being as they are more or less expensive coal eaters. The operation of these plants is looked upon as of far greater importance than their economical running and supervision. There is no standard rule to determine the cost of producing power as applied to the pound of cloth woven, which would apply equally to all plants. Each plant depends upon the grade of cloth woven and the general condition of the machinery.

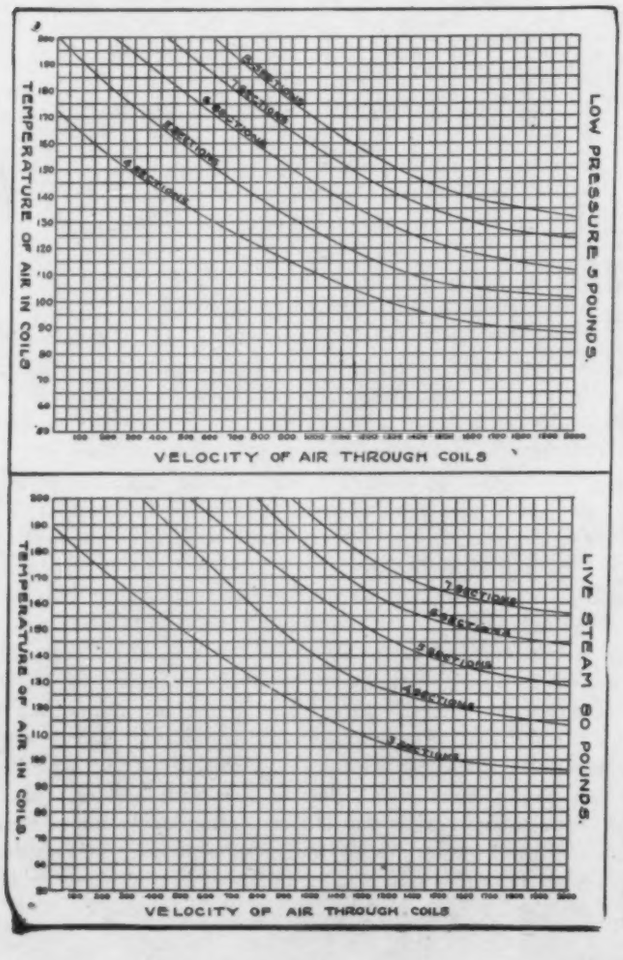
The chief engineer or master mechanic of a cotton mill has, or should have the best and brightest mind of any overseer around the plant, for upon him rests the responsibility for the operation of the whole mill as well as the care and safety of the boilers and engines; these latter might, of course, at any moment, do considerable damage to life and property. Accidents do occasionally happen to even the best of engineers, but a good engineer who is constantly on the watch for defects in his engines or equipment and who repairs them at once to the best of his ability, has by his foresight and wisdom often averted thousands of accidents.

The license law which is gradually coming into use throughout the United States is a great help to the engineer and manufacturer, for it revives the interest of the engineer and makes him realize that his trade is not a dead subject, but on the contrary that it requires constant study in order that he may familiarize himself with the theories and conditions that are constantly arising. The license law is also a great safe-guard to the manufacturer, for it protects him against the dangers of employing incompetent and careless men, who neglect or overlook their duties. Some laws also provide for an inspection of plants which further increases the efficiency of the license law.

As yet most superintendents and managers of cotton mills have not had an opportunity to become familiar with the operation of the power plant nor with the laws that govern their mechanical supervision. To know the trade thoroughly requires a great deal of time and study, and even then it is often difficult to reach the fullest understanding of its many foibles. The manager who is not an engineer and who has never studied the fundamental laws that govern the varied calculations pertaining to the power plant, certainly needs an up-to-date master mechanic to guide him.

HEATING POWER OF STEAM COILS.

The amount of heat transmitted per square foot of heating surface from steam coils naturally depends upon the difference in temperature between the steam on the inside and the air upon the outside. But the air temperature close to the pipes is largely influenced by the rate of flow across the surface. When the air remains practically stagnant the condensation will be put a fraction of a pound per hour per square foot, but as the velocity increases so also does the condensation—which is a direct measure of the heat which is transmitted—and the condensation will run up into pounds per hour for the same surface area. Manifestly the higher the velocity the more rapid will be the rate of transmission; hence the primary advantage of the blower system of heating under which the air is compelled to pass rapidly across the surface of exposed steam pipes. The result is far greater efficiency per square foot than is obtainable with indirect steam heating.



The ultimate temperature given to the air passing across a stack of steam coils must depend not only on the steam pressure but on the initial temperature of the air and above all on the arrangement of the pipes. The less the depth of the heater or the distance across which the air passes the greater will be the condensation, but the less will the temperature of the air be increased. Intensity of temperature with a given steam pressure can only be obtained by depth of heater.

These relations are not generally known with exactness except by those directly interested in the manufacture and installation of such apparatus. Special interest, therefore, attaches to the accompanying curves which are presented through the courtesy of the Massachusetts Fan Co., Watertown, Mass. Without going into details of construction or conditions these suffice to show that minimum velocity and maximum depth of heater are essential to intensity of temperature. Between these extremes lies average practice with heater depths ranging from 4 to 6 sections (16 to 24 pipes) and velocity from 1,200 to 1,800 feet per minute.

POINTS FOR THE OVERSEER.

BY ROB ROY.

The overseer and his assistants should pay strict attention to their duties and require the same in return from the operatives.

The operatives should be taught to keep their machines clean and in good condition, as it is impossible to do good work when a machine is covered with lint and oil. Second hands and fixers should have control of the operatives placed under their direction. In this way a perfect system can be organized, which is the first step toward success in a mill.

Overseers in charge of departments throughout the mill should be men with character above reproach, as this will enable them, to secure and hold a better class of operatives. A system should be organized and rules carried out as nearly as is possible. An overseer should never make promises to his operatives that he cannot fulfill as they will lose confidence in him, become dissatisfied and shirk their duty, which is detrimental to good work throughout the mill.

The directors of the TROY WASTE MFG. Co. have accepted with regret the resignation of Richard Mayer as treasurer and general manager. Mr. Mayer resigned on account of ill health and his wish for a complete rest. Frank McCarthy, formerly secretary, was elected to fill the position of treasurer and general manager. Robert McCarthy succeeds Frank McCarthy as secretary. The report of the treasurer disclosed a very satisfactory business for the last six months.

William H. Dooley, of Lawrence, Mass., a frequent contributor to the columns of COTTON, has been elected principal of the new industrial school to be established in Lowell, Mass. Mr. Dooley has been the principal of the Lawrence Industrial School since it was established. His many friends are wishing him great success in his new field.

NEW MACHINERY AND TRADE NOTES.

BUMPER CROPS IN THE WEST AND NORTHWEST.

Reports from many sections in the Middle West and Northwest indicate that crops this year are in excellent condition. A bumper crop of wheat in the Northwest is going to readjust business conditions in that territory. Iowa, Nebraska, Kansas, Illinois, and Missouri report good conditions and prospects for a heavy crop of corn and wheat. Ohio and other Eastern Central states report that this year's crop indicates about an average harvest.

Automobile dealers generally are expecting bumper sales. In fact, 1911 cars are moving fast at the present time, owing to the excellent prospects in the crop conditions. "During the past week," says G. M. Berry, sales manager of THE THOMAS B. JEFFERY CO., "more Rambler motor cars have been sold to farmers and other purchasers throughout the Middle West than any other individual week so far this year, and everything indicates that the next few weeks will show even better sales.

"Conditions in the Southwest are not so good as those farther north," says Mr. Berry. However, reports from Texas advise that heavy rains are falling in certain parts and motor car sales seem to be about normal. Considering the Middle West in general, prospects seem to indicate that crops will be such that business conditions in this territory during the fall and winter will be better than ever before."

The French River Textile Co., of Mechanicville, Conn., have placed an order with the General Electric Co. for one 500 kw. turbine, one 200 kw. generator, and one 20 horsepower induction motor. This apparatus is for the joint use of the French River Textile Co. and the Putnam Light & Power Co.

At the present time economy in equipment means the best equipment that money can buy. If you try to save money by buying inefficient machinery, while the economy may seem prominent at first, it soon becomes evident that what seemed to be economy was really extravagance. The following letter to the STEEL HEDDLE MFG. CO. is self-explanatory and will no doubt prove of interest to many readers of COTTON:

Concord, N. C., April 25, 1911.

Steel Heddle Mfg. Co.,
Philadelphia, Pa.

Dear Sirs:—We have been using the *Flat Steel Heddles* for the last five years and find them superior to any heddle we ever used and would not change back to the old German heddle for anything. We get better production and better cloth. No mill will buy any other after once using the *Flat Steel Heddle*. We have less break outs than ever before. I cannot say too much for the *Flat Steel Heddle*, for they have done us worlds of good and will never buy anything else.

Yours very truly,
W. L. ROBINSON, Supt.,
Cannon Mfg. Co.

The trouble with many softening oils is their inability to stand heat; they get easily sour in summer time. In preparing their soluble softening oil the ARABOL MFG. CO., of New York, have overcome this difficulty and have secured a compound of absolute uniformity all the year round. It is easy to handle and, by those who have tried it, preferred to tallow and other oils and greases. It is neutral and therefore most suitable to close woven and strong goods. It gives a smooth finish to the warps, while the threads divide well in the lease rods and the cylinder of the slasher remains perfectly clean.

PERSONAL.

Frank Lees, representing BOSSON & LANE, of Atlantic, Mass., sailed for England on July 25th, to be away for several weeks.

J. MERRITT MATTHEWS, PH. D., consulting chemist to the Textile Industries, Chemists Building, 50 East Forty-first Street, is informing his friends in the various textile industries that he has established an office and laboratory in the new Chemists' Building in New York City, where every facility and equipment is at hand to furnish his clients with the most efficient service. He is prepared to undertake investigations and researches in all problems relating to the chemical processing of the textile fibres, such as bleaching, mercerizing, dyeing, finishing, examination of raw products and materials used in manufacture. Yearly arrangements made with mills for a scientific supervision of their work and standardization of their processes along lines of greatest efficiency and economy.

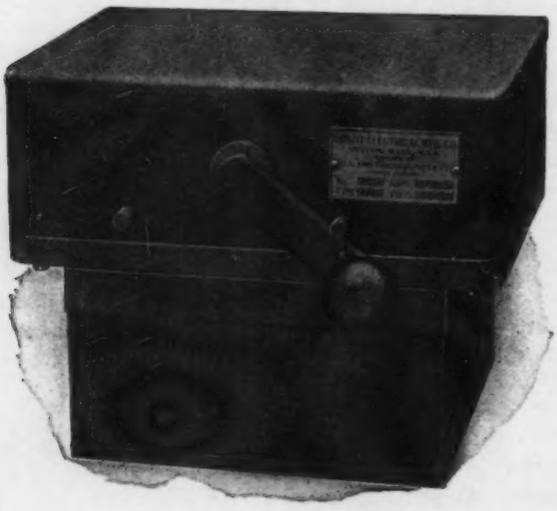
LOGEMANN BROS. COMPANY, of Milwaukee, Wis., have recently installed their textile baling presses in the Hannah Pickett Mills, Rockingham, N. C.; Entwistle Mfg. Co., Rockingham, N. C.; Wiscassett Mills, Albemarle, N. C.; Henderson Cotton Mills Henderson, N. C.; Edenton Cotton Mills, Edenton, N. C.; Altavista Cotton Mills, Altavista, Va.; and Westervelt Mills, Greenville, S. C. These orders have been placed through J. H. Mayes, of Charlotte, N. C., Southern representative of Logemann Bros. Company.

Louis Hirsch, 260 West Broadway, New York City, states that the rumor which has been circulated of late in knit goods manufacturing circles, that the business of H. Alban Ludwig, Chemnitz, manufacturers of full fashioned and rib top machines, had been bought out by Schubert & Salzer, Inc., of Chemnitz, has absolutely no foundation in fact. Mr. Hirsch states further that while there is no wish on their part to prosecute the originator of this false statement, they do wish to deny it most emphatically. The Ludwigs are recognized as leaders in this line of business and the present managers are keeping up the reputation and integrity which their firm has earned during the last thirty-two years of its existence, and the managers have no reason whatever to wish the well-known name of Ludwig to disappear from the market. Mr. Hirsch is the sole representative for the United States and Canada for the Ludwig machines.

THE PROTECTION OF MOTORS IN TEXTILE MILLS.

There is no class of motor service where continuity of operation is of more importance than in textile mills. These mills contain a number of small machines, each group of machines or each machine being driven by an electric motor of small size, often five horse-power or less. The number of motors per foot of floor space is probably greater in textile mills than in any other manufacturing industry. The operators are almost entirely without mechanical training, which fact renders adequate protection of motors a rather difficult problem. When it is considered that the labor cost is the same whether the motor is running or not, the importance of the protective problem will be self-evident.

In order to understand the problem it is necessary to consider in a general way some of the protective devices known as circuit breakers, switches, etc., usually placed between the various classes of machinery to protect machines on both sides of them. The generator in the power station supplies the motors. Between the generator and the motors



TYPE ID CIRCUIT BREAKER.

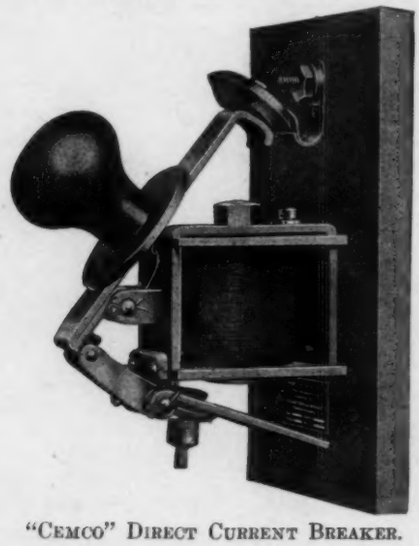
are placed one or more circuit breakers, one side of the circuit breakers being connected to the generator circuit and the other side to the motor circuit, and the circuit breaker, to adequately fulfill its duty, must recognize the characteristics of the apparatus on both sides of it.

The function of protective apparatus is to cut off the motor when a further continuance of the current through it would result in damage and it is most important to remember that this is the only duty of the protective device. A successful protective device will never open unless it is necessary for it to open in order to prevent damage—under normal conditions it must not open. As abnormal conditions always mean a rise of current from three to six times full load current, depending in what these abnormal conditions are, straight overload protection without any time-limit feature is the proper protection for textile motors.

All textile motors are divided into two general classes—direct current and alternating current. Direct-current motors can be protected with either circuit breakers or fuses, although the only advantage of fuses is their low first cost. Where protected with circuit breakers a motor should have a double pole, independent closing, double-coil circuit breaker, which means that the two poles of the circuit breaker should be independent. They should be so interlocked that an overload on either side of the motor will open both of the poles, and they should be arranged so that the operator must close them one at a time so that in the event of a short circuit the one which is not being held closed will open the circuit. If this is done, the only protection needed on the motor is the double-pole circuit breaker, no switch being needed in series.

On alternating-current motors the fuse not only does not add any element of safety, but actually adds an element of danger. One of the most frequent causes of induction motors burning out under normal load is due to their inherent ability to run single phase when once brought to speed on multiphase; in other words, if one of the fuses of a three-phase circuit should blow, the motor would continue running and would carry practically its full load on one phase only, and this one phase being overloaded, would burn out even though the mechanical load on the motor was not greater than normal.

This condition cannot be remedied by the use of no-voltage coils, as a three-phase motor will generate approximately full-load voltage across the idle phases, and, therefore, the no-voltage coils, no matter how many are installed, recognize no difference between the normal condition of the circuit and the single-phase condition of the circuit with motors running. The only safe proposition is to omit the fuses altogether and depend on circuit breakers which are so arranged that when an overload occurs it will open all of the phases at once.



"CEMCO" DIRECT CURRENT BREAKER.

Due to the necessity for frequently starting and stopping an induction motor, and of having everything about the switches enclosed, it is best to use oil switches and automatic circuit breakers for induction motors. The oil not only keeps the arc from igniting any of the floating textile material, but renders it easy to open even on extremely heavy loads and gives a means of making a neat, self-contained, protective device.

As an example, two of the forms of protective devices, one for direct current and one for alternating-current motors for textile mill use particularly, are shown, a "Cemco" direct-current breaker, and a "Cemco ID" oil circuit-breaker, both made by the Conduit Electrical Mfg. Co., of Boston. The first direct-current breaker has two

coils, is interlocked, independent closing, and is noteworthy for its extremely rugged and massive construction. The second breaker is not only simple, but is entirely enclosed, and is so arranged that an unskilled operator cannot get into any trouble by its use.

If every textile motor in a mill were protected by a circuit breaker similar in form to those given above and these breakers subjected to a regular system of inspection and care, the output of the mill would be not only increased, due to less frequent shutting down of the motors, but the fire risk would be lessened and the efficiency of the operators would be increased at the same time.

THE IMPORTANCE OF PROPER DRYING AFTER BLEACHING.

Every manufacturer is desirous of having his cloth, after drying, left in a soft, elastic, natural condition, and no one questions that this can be obtained by slow drying in a moderately heated atmosphere. Drying at a high temperature, by using a blast of hot, dry air, not only makes the fabric harsh, but also wastes an enormous amount of heat, and yet in spite of this, many of the older manufacturing concerns adopted this wasteful and objectionable method.

To accomplish perfect and economical drying, the "Hurricane" automatic looping and drying machine has been designed, for handling underwear, cloth, Turkish towels, etc. It is remarkable not only on account of the large capacity obtained in a small floor space, but also from the fact that the goods emerge soft and elastic, rivalling nature's way of drying. The goods are automatically hung over the poles attached to the traveling conveyor, then dried, delivered and folded. The entire operation is therefore much more economical and convenient than can possibly be obtained with any other system.

The framework of the machine is made entirely of structural steel, with walls composed of removable panels, which fit tightly into the steel framing. In order to retain the heat within the dryer and prevent its radiation, the outside panels are composed of two thicknesses of steel sheets, having corrugated air-cell asbestos in between them. After the air is heated by means of steam coils, it is recirculated by steel blade fans, the bearings of the latter being entirely outside of the dryer and away from the heat. A small exhaust opening is provided, however, so that a proper proportion of the damp air is being constantly discharged, and the heated atmosphere consequently maintained at the proper point of humidity to give most economical drying results.

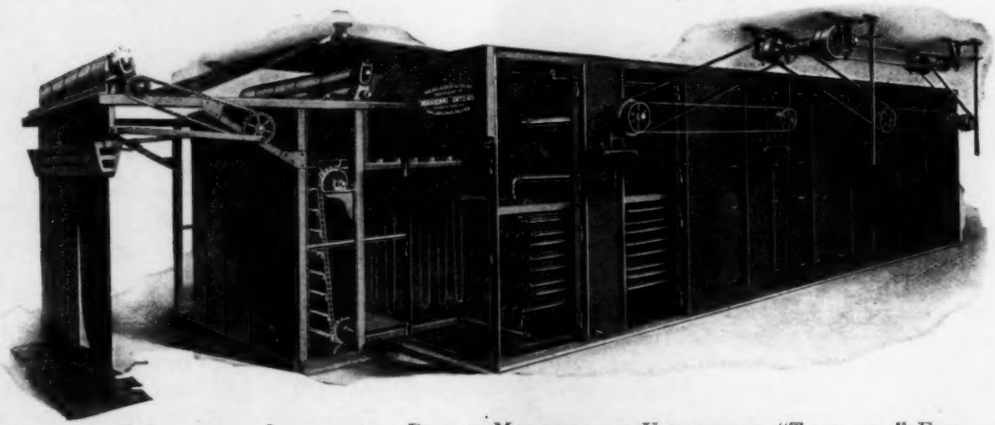
The speed of the conveyor is regulated according to the weight of the fabric, varying usually from fifteen to forty minutes. In that time, however, the cloth is thoroughly dried, and a soft, flexible fabric delivered, that would ordinarily have taken hours to produce by the old system.

Of the many practical objections to drying goods in an ordinary heated room, one of the greatest is the tendency of the goods to become streaked, owing to the drainage induced by hanging the goods in one position for a great length of time. The "Hurricane" Automatic Dryers, because of the strong, positive current of air moving upward through the goods, accomplishes rapid drying and entirely eliminates this difficulty.

Turkish towels dryed by this automatic system are more lofty and open, and the colors are brighter. Underwear is dried without any unequal tension or stretching, consequently the goods come out uniform and the cutting can be done to better advantage.

In order to meet the requirements of both the large and small manufacturing establishments, these machines are built in various sizes and capacities, by the PHILADELPHIA DRYING MACHINERY CO., 6721 Germantown Avenue, Philadelphia, Pa., who also make a specialty of complete equipments for bleaching, dyeing, drying and finishing, and to whom all inquiries should be addressed.

John Eccles, who has been connected with the Ponemah Mills, of Taftville, Conn., for the past forty-one years as boss weaver, superintendent, and latterly as agent, tendered his resignation on July 1st, which was reluctantly accepted by the company. Mr. Eccles was presented with a handsome loving cup by thirty-two friends and employees. Geo. Whittlesey made the presentation, and said that those whose names were with a suitable inscription engraved on the cup, did not wish to see Mr. Eccles leave without some fitting remembrance. The affair was an entire surprise to Mr. Eccles. Frank Rickartson, late agent for the Burgess Mills, of Pawtucket, R. I., has been appointed to succeed Mr. Eccles.



"HURRICANE" AUTOMATIC LOOPING AND DRYING MACHINE FOR UNDERWEAR, "TOWELING," ETC.

WASTED HUMIDITY.

The Autoforce Ventilating System, which is attracting a great deal of attention among owners and operators of textile mills, has been specified by the engineers for the Saco-Pettee Company and the Pacific Mills. The Autoforce is already in use on Mr. Plunkett's Greylock and Berkshire Mills, Bernon Mills, Saxony Worsted, Warner Cotton Mills, Newburyport, Mass., Abbott Worsted Mills, at Forge Village and Graniteville, Mass., as well as many others throughout the country. They have as customers favoring them with repeat orders, many of the largest concerns in the world of their kind, such as the International Harvester Company, Standard Oil Company, Burgess Sulphite Fibre Mills, Standard Wall Paper Company, Armour Company, Revere Rubber Company, and others.

It is needless to say that the swinging cowl that sells for one dollar an inch, which is a good ventilator, would be used in preference to the Autoforce that costs over three times as much, especially when the freight rate to the West and South is figured, unless their engineering departments were able to prove by anemometer test that the Autoforce air pump was sufficiently superior in every way to justify the additional expenditure.

The swinging cowl on a sawtooth roof has a fairly good displacement, because of the closed end toward the wind, and a free exit to the leeward, equal to or larger than the diameter of the stub, but when the wind currents flow below normal, the cowl has but very little, if any, natural displacement because of its failure to be able to harness that low velocity and any excessive heat created by the sun's rays only helps to handicap the natural ventilation created by the greater heat within than without the building; the sun's rays beating on a sawtooth roof have a tendency to create and maintain an excessive heat in the peak similar to that experienced in the eaves or attic of a building. This acts as a hot air pocket, and if hotter than the air in the weave shed in this instance, unless there is a high velocity of wind, it very greatly retards the ventilation. Machinery generates more or less heat, and even in the Southern climate the outside air during many months has a lower temperature, and under such conditions the cowl will give fairly good satisfaction; but the makers not only claim a greater displacement for the Autoforce in comparison with the swinging lobsterback elbow, or cowl, under the most favorable conditions for the latter, but in addition they claim the harnessing of the air currents so that they are able to create and maintain a known and even displacement.

In textile mills a great deal of study is naturally given to the humidifying and ventilating equipment of weave sheds and spinning rooms; for instance, one mill examined some time ago had a large number of heads to supply and maintain a certain amount of humidity in connection with a number of blower outlets supplying heated air; an average humidity of 60 was desired. The result of a test showed humidity of about 40 on one side of the building and over 80 on the other; the low humidity was on the windward side, which was to the westward, the building running exactly north and south. It was a brisk cool day in the latter part of February and about half-past one in the afternoon. The wind velocity was 16.5 miles per hour; the outside humidity was about 30. As the sun's rays struck on about one-third of the floor space, some effect was thereby produced on the inside conditions, and the infiltration and inleakage of the air had a tendency to bring the outside humidity conditions into the mill; on the shady eastward or lee side it was naturally much cooler.

All the air being forced into the spinning room on some known basis of requirement, had no definite and known place of exit, so that the condition produced was a plenum, so strong that the pressure was almost noticeable to a layman; the natural suction on the leeward side had a tendency to bring both the heat and humidity conditions to that point of exit. There was no way for this heated air forced in to find an outlet except by the leaks afforded by the cracks and crevices about the windows. It is as essential to arrange for an outlet as to plan for the introduction of a certain amount of air supply with the heat. In this case condensation on the walls of the eastward side was easily seen, with a much higher humidity than was needed and a lower humidity than desired on the sunny or windward side. Through the center of the weave shed 30-inch swinging cowls were on the peak of each sawtooth. The heated air forced into this room with the delivery of the humidifiers had a tendency to make a short cut to the cowls, thereby losing a large proportion of the elements forced in at an expense to create and maintain certain conditions.

To overcome this difficulty the Autoforce plans call for running delivery pipes wherever convenient to within about three feet of the floor, so that the increased outward suction created by the Autoforce air pumps would be forced to draw from this point, equalizing the temperature and humidity on the looms.

In the case of a mill with humidity supplied by air pressure, the outlets were pointed towards the ceiling and the pressure behind this spray and the draught created by the ventilator on the roof had a tendency to take the moisture directly out before it had benefited the condition of the room, thereby creating a wasteful process.

The main claim for the Autoforce is that instead of the sun's rays being a handicap when the ventilation is most needed, they form one of the elements harnessed, so as to be of material assistance in utilizing a low wind velocity. The heat created in any other device known to science to-day is a powerful handicap and prohibits natural ventilation when needed most.

In one test made it was found that the Autoforce, although not set in a favorable position, showed very little increase in delivery with wind velocities from five to ten miles an hour; in other words, when the air currents had practically doubled there was but a slight increase in delivery, carrying out the claim of being able to maintain an equal displacement, which in connection with a known feed helps to eliminate any constant adjustment of the supply conditioning. The jet of air passing between the two cones of the Autoforce eliminates to a certain extent the effect of the wind passing over the outside cone.

Anyone desiring to secure further details concerning this system of ventilation may have at their disposal, gratis, the engineering department of the AUTOFORCE VENTILATING SYSTEM by addressing the executive offices at 53 Devonshire St., Boston, Mass.

The Berlin Aniline Works, 213 Water St., New York City, are sending out two new color cards describing their Guinea red SDB and SDG and their Guinea black 3 B X extra. These cards will be sent to any interested dyer upon application.